



**ICESat (GLAS) Science Processing Software Document Series**

**The GLAS Standard Data Products Specification—  
Level 1, Version 9**

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Level 1, Version 9**

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# Foreword

The GEOSCIENCE LASER ALTIMETER SYSTEM (GLAS) is the primary instrument for the ICESat (Ice, Cloud and Land Elevation Satellite) laser altimetry mission. ICESat was the benchmark Earth Observing System (EOS) mission for measuring ice sheet mass balance, cloud and aerosol heights, as well as land topography and vegetation characteristics. From 2003 to 2009, the ICESat mission provided multi-year elevation data needed to determine ice sheet mass balance as well as cloud property information, especially for stratospheric clouds common over polar areas. It also provided topography and vegetation data around the globe, in addition to the polar-specific coverage over the Greenland and Antarctic ice sheets.

This preliminary document defines the Level-1 GLAS standard data products. This Standard Data Products Specification is developed under the structure of the NASA STD-2100-91, a NASA standard defining a four-volume set of documents to cover an entire software life cycle. Under this standard a section of any volume may, if necessary, be rolled out to its own separate document. This document is a roll out of the GLAS ESDIS Software Detailed Design Specification under the Product Specification Volume.

This document addresses the data flow, interfaces, record and data formats associated with the GLAS Level 1 standard data products. GLAS Level 1 standard data products are composed of Level 1A and Level 1B data products. The term “standard data products” refers to those EOS instrument data products listed in the Earth Science Data and Information System (ESDIS) Project data base that are routinely generated within the EOSDIS Distributed Active Archive Center (DAAC) or Science Computing Facilities (SCFs). Each data product has a unique Product Identification code assigned by the Senior Project Scientist.

Level 1A and Level 1B Data Products are composed from those Level 0 data that have been reformatted or reversibly transformed to corrected and calibrated data in physical units at the full instrument rate and resolution.

This document was prepared by the Cryospheric Sciences Laboratory at NASA Goddard Space Flight Center, in support of B. E. Schutz, GLAS Science Team Leader for the GLAS Investigation. This work was performed under the direction of David W. Hancock, III, who may be contacted at (757) 824-1238, David.W.Hancock@nasa.gov (e-mail), or (757) 824-1036 (FAX).

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## Section 1

# Introduction

### 1.1 Identification of Document

This document is identified as the GLAS Level 1 Standard Data Products Specification (SDPS-L1). The unique document identification number within the GLAS Standard Data Software documentation numbering scheme is GLAS-DPS-2621. This edition marks the final release of this document.

### 1.2 Scope of Document

This document addresses the purpose, usage, and description of the GLAS Level 1 Standard Data Products. The intended audience for this document is the GLAS Science and Instrument Teams, the ESDIS Project and related focus teams, the community of EOS data users and investigators, and the GLAS Science Algorithm Software (GSAS) Development Team.

### 1.3 Purpose and Objectives of Document

The purpose of the GLAS Level 1 Standard Data Products Specification is to provide a high-level descriptive document for the data products. This document describes the purpose, usage, content, and format of the GLAS Level 1 Data Products. It describes the structure, physical storage, organization, and access characteristics of the GLAS Level 1 Data Products. The document additionally describes file transfer methods to support product access, the data flow associated with the data products, and the data storage and generation characteristics of the data products.

### 1.4 Document Organization

This document's outline is assembled in a form similar to those presented in the NASA Software Engineering Program [Information Document 2.3a].

### 1.5 Document Status and Schedule

This is the final edition of this document.

### 1.5.1 Document Change History

Document Name: GLAS Standard Data Products Specification - Level 1		
Version Number	Date	Nature of Change
Preliminary	December 31, 1995	Original Version
Version 1.2	March 1998	Text, Figures, and Tables updated for Level 1 data updates, for the change to GLAS standard data product generation being performed at the GLAS SCF, and change of the spacecraft name to ICESAT.
Version 2.0	January 1999	Updates to Data Product Contents
Version 3.0	November 2000	Updated Data Product Contents coincident with the GLAS Science Algorithm Software V1 release.
Version 4.0	November 2001	Updated Data Product Contents coincident with the GLAS Science Algorithm Software V2 release.
Version 5.0	July 2002	Updated Data Product Contents coincident with the GLAS Science Algorithm Software V2.2 release.
Version 6.0	October 2002	Revised for Version 3.0 software.
Version 7.0	August 2004	Revised for Version 4.0 software.
Version 8.0	November 2005	Revised for Version 5.0 software.
Version 9.0	August 2012	Revised for Version 6.0 software. Final Release

## Related Documentation

### 2.1 Parent Documents

The GLAS Level 1 Standard Data Products Specification is considered a “roll-out” from the Product Specification as the parent document or volume. Specific topics pertaining to data descriptions are located in the External Interface section under the Detailed Design document template.

This document is subordinate to any top-level mission or instrument management plan documents, and as such, recognizes these documents as external parent documents in lineage. The recognized external EOSDIS and GLAS parent documents superior to this document are listed below.

- a) *NASA Earth Observing System Geoscience Laser Altimeter System GLAS Science Requirements Document*, Version 2.01, October 1997, Center for Space Research, University of Texas at Austin.
- b) *GLAS Science Software Management Plan*, NASA/TM-1999-208641/Version 3/Volume 1, August 1998, NASA/GSFC Wallops Flight Facility.

### 2.2 Applicable Documents

Applicable documents include reference documents that are not parent documents. This category includes reference documents that have direct applicability to, or contain policies binding upon, or information directing or dictating the content of this document. The following documents are related to, or contain policies or references pertinent to the contents of this document.

- a) *Data Production Software, Data Management, and Flight Operations Working Agreement for GLAS*, TBD, NASA Goddard Space Flight Center.
- b) *The Algorithm Theoretical Basis Document for Level 1A Processing*, NASA/TM-2012-208641 / Volume 5, June 2012, NASA Goddard Space Flight Center, et al.
- c) *The Algorithm Theoretical Basis Document for the GLAS Atmospheric Data Products*, NASA/TM-2012-208641 / Volume 6, July 2012, NASA Goddard Space Flight Center, et al.
- d) *The Algorithm Theoretical Basis Document for the Derivation of Range and Range Distributions from Laser Pulse Waveform Analysis for Surface Elevations, Roughness, Slope, and Vegetation Heights*, NASA/TM-2012-208641 / Volume 7, August 2012, NASA Goddard Space Flight Center, et al.
- e) *The Algorithm Theoretical Basis Document for the Atmospheric Delay Correction to GLAS Laser Altimeter Ranges*, NASA/TM-2012-208641 / Volume 8, October 2012, NASA Goddard Space Flight Center, et al.

- f) *The Algorithm Theoretical Basis Document for Tidal Corrections*, NASA/TM-2012-208641 / Volume 9, November 2012, Scripps Institution for Oceanography, et al.
- g) *The Algorithm Theoretical Basis Document for Precision Orbit Determination*, 2013, University of Texas Center for Space Research, et al.
- h) *The Algorithm Theoretical Basis Document for Precision Attitude Determination*, 2013, University of Texas Center for Space Research, et al.
- i) *The Algorithm Theoretical Basis Document for Laser Footprint Location (Geolocation) and Surface Profiles*, 2013, University of Texas Center for Space Research, et al.
- j) *GLAS Standard Data Products Specification - Level 2*, NASA/TM-2013-208641 / Volume 14, NASA Goddard Space Flight Center, et al.
- k) *GLAS Standard Data Products Specification - Data Dictionary*, NASA/TM-2013-208641 / Volume 15, NASA Goddard Space Flight Center, et al.
- l) *GSAS Detailed Design Document*, NASA/TM-2013-208641 / Volume 16, NASA Goddard Space Flight Center, et al.
- m) *GSAS User's Guide*, NASA/TM-2013-208641 / Volume 17, NASA Goddard Space Flight Center, et al.

## 2.3 Information Documents

The following documents are provided as sources of information that provide background or supplemental information that may clarify or amplify material in this document.

- a) *NASA Software Documentation Standard Software Engineering Program*, NASA-STD-21000-91, July 29, 1991, NASA.
- b) *The Geoscience Laser Altimetry/Ranging System*, IEEE Transactions on Geoscience and Remote Sensing, Vol. GE-25, No. 5, September 1987.
- c) *EOS Altimetry/GLAS Phase-A Study*, November 1995, NASA Goddard Space Flight Center.
- d) *Memorandum: GLAS Data Products, Center for Space Research*, December 23, 1993, University of Texas at Austin.
- e) *GLAS Science Computing Facility (SCF) Plan*, October 1997, NASA/GSFC Wallops Flight Facility.



## Purpose and Description of the Data Products

### 3.1 Purpose of the Data Products

The purpose of the GLAS Level 1 Standard Data Products is to provide the initial reduced GLAS instrument data to the GLAS Science Team and to provide input to the Level 2 data product generation. The GLAS Level 1 Data Products are monitored for data quality and instrument performance. The GLAS Level 1 Data Products are available to the data user community for analysis purposes from the NSIDC DAAC.

### 3.2 Description of the Data Products

Table 3-1 identifies the Level 1 Data Products. The data products are integer-binary format files containing fixed-length records. Each data record consists of several data elements. An element is either an Item or an Array of Items. The elements are measurements and associated correction values obtained from specific GLAS science algorithm sets. The data products are formatted in scaled integer binary format with both attached and unattached metadata containing identification, processing history, and data descriptive information.

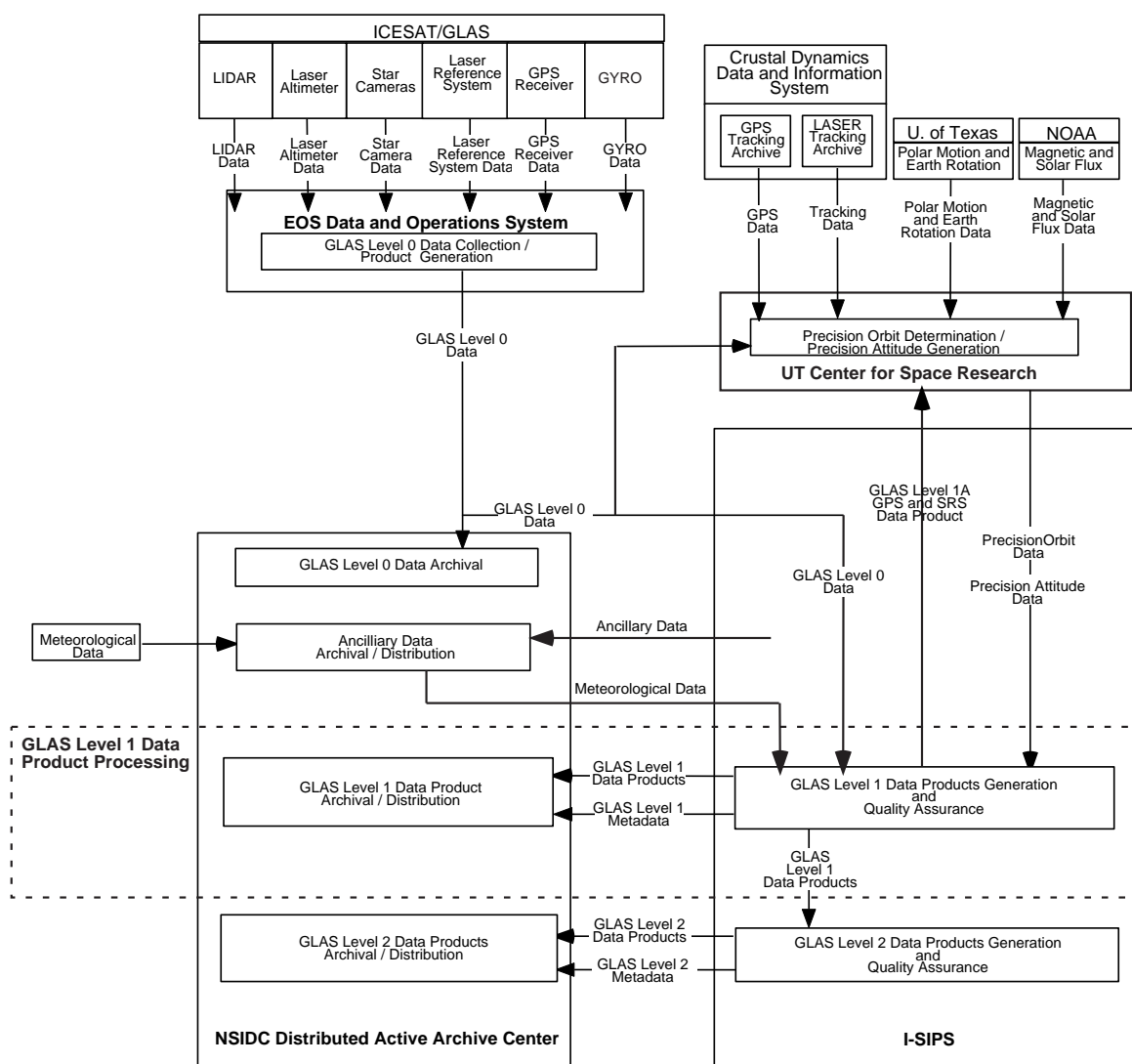
**Table 3-1 GLAS Level 1 Standard Data Products**

<b>Product ID (Identification)</b>	<b>Product Name</b>	<b>Product Level</b>
GLA01	Altimetry Data File	1A
GLA02	Atmosphere Data File	1A
GLA03	Engineering Data File	1A
GLA04-01	LPA Data File	1A
GLA04-02	LRS Data File	1A
GLA04-03	GYRO Data File	1A
GLA04-04	IST Data File	1A
GLA04-05	BST Data File	1A
GLA04-06	SCPA Data File	1A
GLA05	Waveform-based Elevation Corrections File	1B
GLA06	Elevation File	1B
GLA07	Backscatter File	1B

Figure 3-1 illustrates the source Level 0 data being processed to generate the Level 1 Data Products on the I-SIPS (ICESAT Science Investigator-led Processing System). The GLAS sci-

ence data processing software transforms the instrument data into the appropriate time-ordered, along-track 1064 nanometer and 532 nanometer Level 1A and Level 1B data parameters and elements. Additional Level 1A science processing algorithms retrieve the GPS receiver data and stellar reference system data and include in the Level 1A product file records. Instrument engineering monitor data along with derived calibration data items are recorded. The Level 1 Data Products are recorded with sufficient detail so as to allow the recovery of the original input elements. In support of the GLAS Science Team, the GLAS Operations Team performs quality assurance at the I-SIPS and returns data quality and descriptive metadata to EOSDIS for incorporation in the EOS data base system.

The specific details of the data product structure, content, format, and data element details will be presented in Section 6. Data sizing, storage burden, and physical media details are provided in Section 5.



**Figure 3-1 Level 1 Data Products Within the Processing Hierarchy**

## Section 4

# Environment

### 4.1 Hardware Characteristics and Limitations

The required inputs to the software that creates the Level 1 Data Products are the GLAS Level 0 instrument and spacecraft telemetry data. The Level 0 data is available from EDOS in Production or Expedited Data Sets as defined in the I-SIPS/EDOS ICD [Applicable Document 2.2.m]. The GLAS Level 1A and Level 1B Standard Data Products are generated on the I-SIPS.

The I-SIPS consists of multiple Linux-based computers operating under a standard environment in support of GLAS Science Team operations including the standard data product generation and quality assurance monitoring. The GLAS Level 1A and Level 1B Data Products and their metadata (including QA data) are archived at the National Snow and Ice Data Center (NSIDC) Distributed Active Archive Center (DAAC). The Level 1A and Level 1B associated data description and support information are included in the EOSDIS data base to facilitate EOS client inquiry and retrieval activities. The distribution management function of the DAAC allows clients to perform direct search and access of the Level 1A and Level 1B data or to request preparation of Level 1 Data Products.

Some prior versions of the GLAS products were created in a HP/UX big-endian environment. When I-SIPS transitioned to Linux-based little-endian hardware, compiler flags were used to create the products in big-endian format to maintain consistency across product versions. This document describes all products in reference to a big-endian environment.

### 4.2 Data Products Medium and Characteristics

The Level 1 Data Products are delivered to the DAAC and archived under the Earth Sciences data collection within the DAAC's data storage and archival subsystem as defined in the I-SIPS/NSIDC ICD [Applicable Document 2.2.k]. The storage system contains not only the Level 1 Data Products, but also the data descriptions and data advertisements (i.e., textual descriptive and abstract information, also called metadata).

The Earth Science data are implemented in EOSDIS system through a hierarchical storage manager interface. Physical media supported by the storage system interface include the disk storage subsystems, magnetic/optical media subsystems, and tiered archive robotics storage subsystems. EOSDIS clients can directly access the GLAS Level 1A and Level 1B data from the DAAC and can copy the data products to their host processors.

The Level 1 Data Products are available to the GLAS Science Team through the ICESat SCF. See Information Document 2.3.e for a detailed description of the ICESat SCF.

### 4.3 Protocol and Conventions

Protocols and conventions specific to the GLAS SCF were developed by the GLAS Science Team and documented in the SCF Plan [Information Document 2.3e]. When interfacing to the

DAAC, the I-SIPS complies with procedures, conventions, and protocols as defined by the EOSDIS.

Data definition terminology specific to the GLAS Level 1 Data Products is presented in the Glossary at the end of this document. Figure 4-1 "Data Representation" depicts a schematic of the standard data representations used in the GLAS Level 1 Data Products. These data structures are used in the Section 6.0 product format description and in the associated GLAS Standard Data Products Specification - Data Dictionary [Applicable Document 2.2.a].

## Data Types, Sizes, and Representations

Conventions: byte 0 is the most significant byte (MSB)  
bit 0 is the least significant bit (lsb)  
S = the sign bit

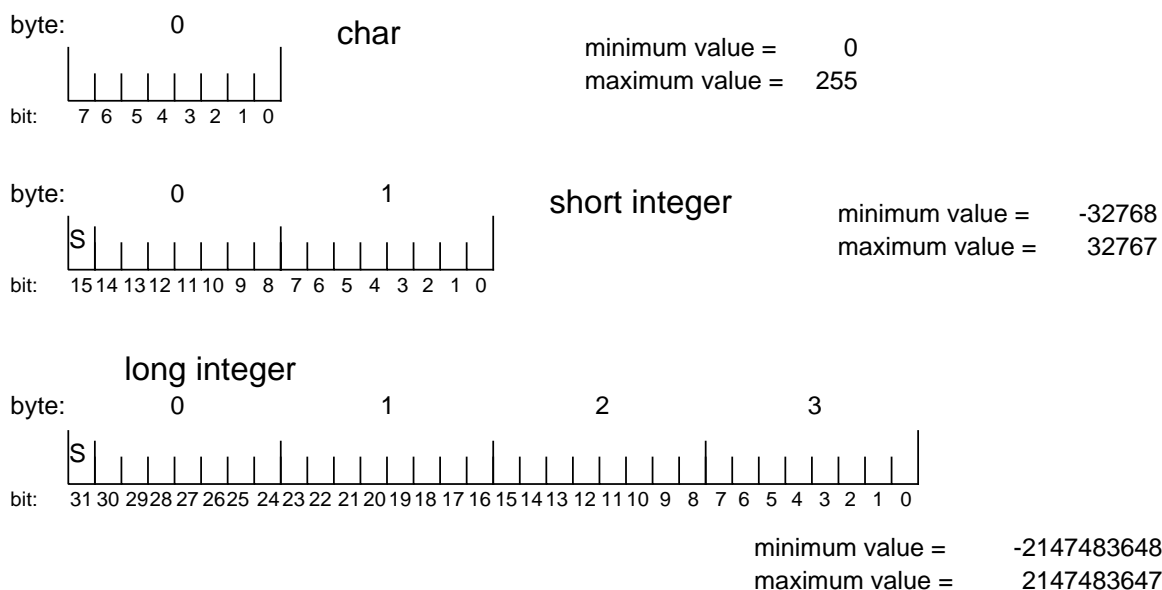


Figure 4-1 Data Representation

## 4.4 Failure Protection, Detection, and Recovery Features

The team supporting operations at the I-SIPS are responsible for failure protection, detection, and recovery of the GLAS Level 1A and Level 1B Data Products stored on the I-SIPS. Initial GLAS Level 1A and Level 1B Data Products error detection is performed during product generation as part of the product and processing quality assurance activity. The GLAS Level 1A and Level 1B Data Products are “backed up” under the routine operational functions performed at the I-SIPS. In the event of failure or error detection in the active working or archive storage, recovery is performed from backup media or from the DAAC archive.

The EOSDIS is responsible for failure protection, detection, and recovery of the GLAS Level 1A and Level 1B Data Products archived at the DAAC.

## Data Flow Characteristics

### 5.1 Volume, Size, and Frequency Estimates

The daily data burdens for the GLAS Level 1A and Level 1B Standard Data Products are listed in Appendix B. This estimate is based on the following operational parameters:

- The spacecraft orbits the Earth at an inclination of 94 degrees and a nominal altitude of 600 kilometers in a circular orbit.
- The orbit (groundtrack) repeat cycle is approximately 91 days based on a frozen orbit.
- The EOS ICESat orbit period is approximately 100 minutes, with a pass period duration of approximately 50 minutes resulting in just under 15 orbits per day.

### 5.2 Data Transfer and Transmission

The GLAS Data Products and associated descriptive metadata are delivered to the DAAC archival facility through the EOS Science Network. The GLAS Level 1A and Level 1B Data Products delivered to the DAAC processing subsystem are designated for fail-safe functions. The GLAS Science Team is provided access to the GLAS Level 1 Data Products through the GLAS SCF via TCP/IP and standard UNIX command operations.

Data access procedures to retrieve the GLAS Level 1A and Level 1B Standard Data Products from the DAAC is detailed at the DAAC.

### 5.3 Timing and Sequencing Characteristics

The GLAS Level 1A and Level 1B Standard Data Products are generated as product files consisting of processed Level 0 data. The basic aggregation of the GLAS Level 1 Data Products is the descriptive information in the header records and GLAS Data Elements in the data records. Records consists of one-second of reduced GLAS instrument, GPS receiver and stellar reference system data, and location data. The exception is the Engineering Data File (GLA03) with records that span 16 seconds. The data parameters and elements contained within the records are groups of forty hertz, five hertz, and one hertz rate data.

All data records within the GLAS Level 1 Data Product files are in ascending time order based on the first pulse time tag or the first sample time tag. All parameters and elements contained within the records are synchronous at either forty hertz, five hertz, or one hertz.

### 5.4 Recipients and Utilization

The GLAS Science Team and the DAAC are the initial recipients of the Level 1 Data Products. At the I-SIPS, the Level 1 Data Products are used to generate the Level 1 metadata and the Level 2 Data Products. The metadata (delivered to the DAAC) include data quality evaluation and statistical reporting on the GLAS Level 1 Data Products to quantify and qualify the

products for science community usage. The GLAS Science Team uses the Level 1 Data Products for research and analysis.

The subsequent audience for the GLAS Level 1 Data Products is the scientific, governmental, and educational community sectors who will obtain the products from the NSIDC DAAC.

## **5.5 Access**

The GLAS Level 1 Data Products are available to the GLAS Science Team from the GLAS SCF. Access to the GLAS SCF is controlled by the GLAS Science Team.

The GLAS Level 1 Data Products are available to the public from the NSIDC DAAC. Procedures for data access are defined by the DAAC.

## Section 6

# Data Product Definitions

## 6.1 Data Product Structure

The GLAS Level 1 Data Products are generated as scaled integer binary files. Each file contains appropriate header, labelling, and metadata information and a collection of one-second records of GLAS instrument, sensor, and time data. The exception is the GLA03 product which contains 16-second records.

## 6.2 Labeling and Identification

Each of the GLAS Level 1 Data Products is uniquely identified by a GLAS standard file name. The form of this file name is

**GLAxx\_mmm\_prkk\_ccc\_tttt\_s\_nn\_fff.eee**

Specific elements within the file name are described in Table 6-1.

**Table 6-1 GLAS File Naming Keys**

Key	Description
xx	The GLAS Product ID (01-15)
mmm	release number for process that created the produce (CCB assigned-combination of software and data)
p	repeat ground track phase
r	reference orbit number
kk	instance # incremented every time GLAS enters a different reference orbit
ccc	cycle of reference orbit for this phase
tttt	track within reference orbit
s	segment of orbit. This is 0 on files that contain multiple segments (GLA02, GLA03, GLA04, GLA07-GLA15) and 1,2,3, or 4 on GLA01, GLA05, and GLA06.
nn	granule version number (the number of times this granule is created for a specific release)
fff	file type (numerical, CCB assigned for multiple files as needed for data of same time period for a specific ANCxx or GLAxx, i.e. multi-file granule)

The structure and content of the GLAS Data Product headers and labels are contained in the GLAS Standard Data Products Specification - Data Dictionary [Applicable Document 2.2.a].

### 6.3 Data Product Substructure Descriptions

Data product descriptions are provided in Appendix A and online in HTML format at the WFF GLAS website. Descriptions are also in the GLAS Standard Data Products Specification - Data Dictionary. The URL for product descriptions is:

[http://glas.wff.nasa.gov/prod\\_format/v60\\_products/index.html](http://glas.wff.nasa.gov/prod_format/v60_products/index.html)

Table 6-2 lists the fields shown in each data product description entry.

**Table 6-2 GLAS Data Product Description Fields**

Field	Description
Product ID	GLAS File ID (GLA01, GLA02, etc).
Name	Descriptive name.
Product Level	Product Level (L0,L1A,L1B,L2,L3).
Science Discipline	Primary associated science discipline.
Investigator	Primary investigator.
Archive Site	Location at which this file will be permanently archived.
Source	A flag giving source data system of this file.

Table 6-3 lists the data coverage description fields.

**Table 6-3 GLAS Data Coverage Description Fields**

Field	Description
Product ID	GLAS File ID (GLA01, GLA02, etc).
Temporal Resolution	Nominal time span, in seconds, of each record of data within a file.
Temporal Coverage	Nominal time span, in minutes, of data contained within a file.
Horiz Res Coverage	Horizontal coverage, in meters, over Earth's surface for each instrument measurement.
Vert Res Coverage	Vertical coverage, in meters, over the Earth's surface for each instrument measurement.
Root/External Flag	A flag signifying whether this file is:  <b>0:</b> neither of the following. <b>1:</b> the head-of-chain (Level 0 data) of an instrument's data stream. <b>2:</b> a file from an external source.

Table 6-4 lists the data volume description fields.



**Table 6-4 GLAS Data Volume Description of Fields**

Field	Description
Product ID	GLAS File ID (GLA01, GLA02, etc).
Frequency (per day)	Number of times processing PGE is executed.
Files per Granule	Number of physical files per each granule.
CPU (min)	Number of processing minutes required to produce a granule of this data.
MB per Day	Estimated amount of this data processed each data.
Record Size (bytes, 0=variable)	Size, in bytes, of a single record of data. 0 indicates a variable sized record.
Granule Size (MB)	Size, in megabytes, of a granule.
Granules per Day	Number of granules normally processed per day.
Revs per Granule	Number of earth revolutions contained in one granule.

## 6.4 Level 1 Standard Data Products

Table 6-5 lists the fields shown in each data product format entry. Data product formats are provided in Appendix B. The GLAS Standard Data Product Specification - Data Dictionary [Applicable Document 2.2.a] contains a comprehensive data dictionary, set of flag definitions, and metadata definitions. Most of this information is also available on the WFF GLAS web-site at the following URL:

[http://glas.wff.nasa.gov/prod\\_format/v60\\_products/index.html](http://glas.wff.nasa.gov/prod_format/v60_products/index.html)

**Table 6-5 GLAS Product Format Description Fields**

Field	Description
Product Var Name	Unique identifying name of the product variable.
Offset (bytes)	Offset in bytes from start of data record (start=0).
Prod Data Type	Product (Unscaled) Variable Type and dimensions (in parens).  <b>i1b</b> = Integer, 1 byte <b>i2b</b> = Integer, 2 bytes <b>i4b</b> = Integer, 4 bytes <b>r4b</b> = Real, 4 bytes <b>r8b</b> = Real, 8 bytes etc...
Total Bytes	Total number of bytes used by variable.

**Table 6-5 GLAS Product Format Description Fields (Continued)**

Field	Description
Is Unsigned?	Flag indicating if variable should be treated as unsigned.
Invalid Value/Flag	Indicates what identifies the field as being invalid. <b>None</b> = variable cannot be invalid. <b>gd_invalid_xxx</b> = datatype-specific value which indicates the variable is not valid. <b>[variable name]</b> = name of the flag to check in order to determine validity of the variable.

## 6.5 Ancillary Data Products

A number of static and dynamic ancillary products are required for the generation of GLAS Standard Data Products. Static ancillary products include such information as values for the geoid, values for standard atmosphere and constants used within the science algorithms. Dynamic ancillary products include such information as the precise orbit and pointing for geolocation, atmosphere data for correcting range and tides, MSS, DEM and other geophysical data. Appendix C identifies and/or describes the ancillary products used in the creation of the level 1 and level 2 standard data products.

# Appendix A

## Level 1 Data Products Descriptions

### A.1 Data Product Descriptions

**Table A-1 Data Product Descriptions**

Product ID	Name	Level	Science Discipline	Investigator	Archive Site	Source
GLA01	Altimetry Data	1A	Altimetry	B. Minster	NSIDC	ICESAT SCF
GLA02	Atmosphere Data	1A	LIDAR	J. Spinhirne	NSIDC	ICESat SCF
GLA03	Engineering Data	1A	Engineering	N/A	NSIDC	ICESat SCF
GLA04-01	GLA04 LPA	1A	Location	B. Schutz	Icesat SCF	ICESat SCF
GLA04-02	GLA04 LRS	1A	Location	B. Schutz	Icesat SCF	Icesat SCF
GLA04-03	GLA04 GYRO	1A	Location	B. Schutz	Icesat SCF	ICESat SCF
GLA04-04	GLA04 IST	1A	Location	B. Schutz	Icesat SCF	ICESat SCF
GLA04-05	GLA04 BST	1A	Location	B. Schutz	Icesat SCF	ICESat SCF
GLA04-06	GLA04-SCPA	1A	Location	N/A	Icesat SCF	ICESat SCF
GLA05	Waveform-based elevation	1B	Altimeter Waveform	B. Minster	Icesat SCF	ICESat SCF
GLA06	Elevation	1B	Altimetry	B. Minster	Icesat SCF	ICESat SCF
GLA07	Backscatter	1B	Atmosphere	J. Spinhirne	Icesat SCF	ICESat SCF

## A.2 Data Coverage

**Table A-2 Data Coverage**

Product ID	Temporal Resolution (sec)	Temporal Coverage (min)	Horiz Res Coverage (m)	Vert Rez Coverage (m)	Root/ External Flag
GLA01	1	23	170	0	0
GLA02	1	190	0	76.8	0
GLA03	16	190	76.8	170	0
GLA04-01	1	190	0	0	0
GLA04-02	1	190	0	0	0
GLA04-03	1	190	0	0	0
GLA04-04	1	190	0	0	0
GLA04-05	1	190	0	0	0
GLA04-06	1	190	0	0	0
GLA05	1	190	170	0	0
GLA06	1	190	170	0	0
GLA07	1	190	170	76.8	0

## A.3 Data Volume

**Table A-3 Data Volume**

Product ID	Freq.( per day)	Files per Gran.	CPU (min)	MB per Day	Record Size (0=variable)	Granule Size (MB)	Gran. per Day	Revs per Gran.
GLA01	4	1	45.4	1497.491455	4660	26.74091884	56	0.25
GLA02	4	1	159.03	4701.269531	57056	671.609933	7	2
GLA03	4	1	10.72	136.1412048	26436	19.44874355	7	2
GLA04-01	4	1	1	1545.117188	18752	386.2792969	7	2
GLA04-02	4	1	1	525.3662109	6376	131.3415527	7	2
GLA04-03	4	1	1	28.67431641	348	7.168579102	7	2
GLA04-04	4	1	1	133.4838867	1620	33.37097168	7	2
GLA04-05	4	1	1	180.9448242	2196	45.23620605	7	2
GLA04-06	4	1	1	8.404541016	102	2.101135254	7	2
GLA05	4	1	199.36	1433.71582	17400	25.60206822	7	2
GLA06	4	1	118.84	566.8945313	6880	10.12311663	7	2
GLA07	1	1	157.4	5805.395508	70456	829.3422154	7	2



## Appendix B

# Level 1 Data Product Formats

### B.1 Record Formats

#### B.1.1 Guidelines

The GLAS Data Product record formats were developed under the following guidelines:

- 1) Record size a multiple of 4.
- 2) Start elements on a 4 byte boundary; where not possible use pads or group smaller elements together to get to 4 byte boundary. Pad and move elements so that arrays start on 4 byte boundaries.
- 3) The output structures to build files should be grouped in descending size order, therefore group elements on file logically and in descending size order.
- 4) Data that occurs occasionally in the file should be put in the header. Specifically, data that are changing at a much lower rate than the record rate on the files, will be put in the header. These elements will not be shown in the record format.
- 5) Add spares.

#### B.1.2 GLA01 - Altimetry Data

Fixed length, variable format records. For each second of data there is a main record and a varying number of long or short waveform records each denoted by the GLA01 record type field (i\_gla01\_rectype). Record type "0" is a main record, record type "1" is a long waveform record, and record type "2" is a short waveform. The main record contains all of the altimetry waveform information except that which is directly associated with the return waveform. Succeeding records in sets of either 2 for ocean or 5 for land, as determined by the on-board surface type mask, contain the return waveforms. Long, or land waveform records contain eight 544 sample returns and data. Short, or ocean records contain twenty 200 sample waveforms and associated data.

**Table B-1 GLA01 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA01_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: 1						
6.0 : Last Modified : Thu Dec 02 22:22:24 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_gla01_rectype	12	i2b	2	n/a	No	No
i_spare1	14	i2b	2	n/a	No	No

**Table B-1 GLA01 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_dShotTime	16	i4b (39)	156	microseconds	No	No
i1_pred_lat	172	i4b	4	microdegrees	No	gi_invalid_i4b
i1_pred_lon	176	i4b	4	microdegrees	No	gi_invalid_i4b
i_RespEndTime	180	i4b (40)	160	nanoseconds	No	i_APID_AvFlg
i_LastThrXingT	340	i4b (40)	160	ns	No	i_APID_AvFlg
i_NextThrXing	500	i4b (40)	160	ns	No	i_APID_AvFlg
i_EchoPeakLoc	660	i4b (40)	160	nanoseconds	No	i_APID_AvFlg
i_EchoPeakVal	820	i2b (40)	80	counts	No	i_APID_AvFlg
i_wt_fact_filt	900	"i4b (6, 40)"	960	unitless	No	i_APID_AvFlg
i_filtr_thresh	1860	i2b (40)	80	counts	No	i_APID_AvFlg
i_time_txWfPk	1940	i4b (40)	160	ns	No	i_APID_AvFlg
i_TxWfStart	2100	i4b (40)	160	ns	No	i_APID_AvFlg
i_TxNrg_EU	2260	i4b	4	microjoules	No	i_APID_AvFlg
i_RecNrgAll_EU	2264	i4b (40)	160	attojoules	No	i_APID_AvFlg
i_RecNrgLast_EU	2424	i4b (40)	160	attojoules	No	i_APID_AvFlg
i_txWfPk_Flag	2584	i1b (40)	40	n/a	No	i_APID_AvFlg
i_InstState	2624	i4b	4	n/a	No	No
i_APID_AvFlg	2628	i1b (8)	8	n/a	No	No
i_FiltNumMask	2636	i4b	4	n/a	No	i_APID_AvFlg
i_HOff	2640	i4b (2)	8	Millimeters	No	i_APID_AvFlg
i_ADBias	2648	i4b (2)	8	Meters	No	i_APID_AvFlg
i_RminRmax	2656	i4b (2)	8	Meters	No	i_APID_AvFlg
i_WMinMax	2664	i4b (2)	8	Meters	No	i_APID_AvFlg
i_ObSCHt	2672	i4b	4	Millimeters	No	i_APID_AvFlg
i_engineering	2676	i2b (12)	24	various	No	i_APID_AvFlg
i_compRatio	2700	i2b (2)	4	unitless	No	i_APID_AvFlg
i_N_val	2704	i2b	2	gates	No	i_APID_AvFlg
i_r_val	2706	i2b	2	unitless	No	i_APID_AvFlg



**Table B-1 GLA01 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_ADdetOutGn	2708	i2b	2	counts	No	N/A
i_DEMmin	2710	i2b	2	meters	No	i_APID_AvFlg
i_DEMmax	2712	i2b	2	meters	No	i_APID_AvFlg
i_tx_wf	2714	"i1b (48, 40)"	1920	counts	Yes	i_APID_AvFlg
i_OrbFlg	4634	i1b (2)	2	NA	No	No
i_EchoLandType	4636	i1b	1	unitless	No	i_APID_AvFlg
i_RngSrc_Flag	4637	i1b	1	n/a	No	i_APID_AvFlg
i_timecorflg	4638	i2b	2	N/A	No	No
i_TxFlg	4640	i1b (5)	5	N/A	No	No
i_GainShiftFlg	4645	i1b (5)	5	N/A	No	No
i_spare2	4650	i1b (10)	10	null	No	No
Total Bytes	4660					
Record Type:GLA01_LONG; % of Granule: 30; Record Duration (seconds):0.2; Repeats: 5						
6.0 : Last Modified : Fri Dec 10 12:34:05 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_gla01_rectype	12	i2b	2	n/a	No	No
i_spare1	14	i2b	2	n/a	No	No
i_filtnum	16	i1b (8)	8	n/a	No	i_APID_AvFlg
i_shot_ctr	24	i2b (8)	16	counts	No	i_APID_AvFlg
i_statflags	40	i4b (8)	32	n/a	No	i_APID_AvFlg
i_gainSet1064	72	i2b (8)	16	counts	No	i_APID_AvFlg
i_4nsPeakVal	88	i2b (8)	16	counts	No	i_APID_AvFlg
i_8nsPeakVal	104	i2b (8)	16	counts	No	i_APID_AvFlg
i_4nsBgMean	120	i2b (8)	16	.01 counts	Yes	i_APID_AvFlg
i_4nsBgSDEV	136	i2b (8)	16	.01 counts	Yes	i_APID_AvFlg
i_samp_pad	152	i2b (8)	16	gates	No	i_APID_AvFlg

**Table B-1 GLA01 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_comp_type	168	i1b (8)	8	n/a	No	i_APID_AvFlg
i_rng_wf	176	"i1b (544, 8)"	4352	counts	Yes	i_APID_AvFlg
i_gainStatus	4528	i1b (8)	8	n/a	Yes	i_APID_AvFlg
i_NumCoinc	4536	i1b (8)	8	n/a	Yes	i_APID_AvFlg
i_rawPkHt	4544	i1b (8)	8	counts	Yes	i_APID_AvFlg
i_spare2	4552	i1b (108)	108	n/a	No	No
Total Bytes 4660						
Record Type:GLA01_SHORT; % of Granule: 70; Record Duration (seconds):0.5; Repeats: 2						
6.0 : Last Modified : Fri Dec 10 10:53:18 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_gla01_rectype	12	i2b	2	null	No	No
i_spare1	14	i2b	2	null	No	No
i_filtnum	16	i1b (20)	20	n/a	No	i_APID_AvFlg
i_shot_ctr	36	i2b (20)	40	counts	No	i_APID_AvFlg
i_statflags	76	i4b (20)	80	n/a	No	i_APID_AvFlg
i_gainSet1064	156	i2b (20)	40	unitless	NA	i_APID_AvFlg
i_4nsPeakVal	196	i2b (20)	40	counts	No	i_APID_AvFlg
i_8nsPeakVal	236	i2b (20)	40	counts	No	i_APID_AvFlg
i_4nsBgMean	276	i2b (20)	40	.01 counts	Yes	i_APID_AvFlg
i_4nsBgSDEV	316	i2b (20)	40	.01 counts	Yes	i_APID_AvFlg
i_samp_pad	356	i2b (20)	40	gates	No	i_APID_AvFlg
i_comp_type	396	i1b (20)	20	n/a	No	i_APID_AvFlg
i_rng_wf	416	"i1b (200, 20)"	4000	counts	Yes	i_APID_AvFlg
i_gainStatus	4416	i1b (20)	20	n/a	NA	i_APID_AvFlg
i_NumCoinc	4436	i1b (20)	20	n/a	Yes	i_APID_AvFlg
i_rawPkHt	4456	i1b (20)	20	counts	Yes	i_APID_AvFlg
i_spare2	4476	i1b (184)	184	n/a	No	No

**Table B-1 GLA01 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
Total Bytes 4660						

### B.1.3 GLA02 - Atmosphere Data

Records are fixed length and format and occur once per second.

**Table B-2 GLA02 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA02_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: 1						
6.0 : Last Modified : Tue Feb 15 12:54:05 GMT-0500 (EST) 2011						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i1_pred_lat	12	i4b	4	microdegrees	No	gi_invalid_i4b
i1_pred_lon	16	i4b	4	microdegrees	No	gi_invalid_i4b
i_DEMmin	20	i2b	2	meters	No	i_APID_AvFlg
i_DEMmax	22	i2b	2	meters	No	i_APID_AvFlg
i_g_lid_qf	24	i1b (12)	12	n/a	Yes	No
i40_g_lid	36	"i4b (148, 40)"	23680	$((\text{pe/bin})\text{KM}^2/\text{J})/1000$	No	gi_invalid_i4b
i5_g_lid	23716	"i4b (132, 5)"	2640	$((\text{pe/bin})\text{KM}^2/\text{J})/1000$	No	gi_invalid_i4b
i1_g_lid	26356	i4b (268)	1072	$((\text{pe/bin})\text{KM}^2/\text{J})/1000$	No	gi_invalid_i4b
i40_g_sat_f	27428	i1b (740)	740	n/a	Yes	No
i5_g_sat_f	28168	i1b (84)	84	n/a	Yes	No
i1_g_sat_f	28252	i1b (36)	36	n/a	Yes	No
i40_g_TxNrg_EU	28288	i4b (40)	160	Joules * 1.0d5	No	i_APID_AvFlg
i5_g_TxNrg_EU	28448	i4b (5)	20	Joules * 1.0d5	No	i_APID_AvFlg
i1_g_TxNrg_EU	28468	i4b	4	Joules * 1.0d5	No	i_APID_AvFlg
i_g_IntRet	28472	i4b	4	photons*100	No	i_APID_AvFlg
i_Rng2PCProf	28476	i4b	4	centimeters	No	i_APID_AvFlg
i_Rng_PkRt	28480	i4b	4	centimeters	No	gi_invalid_i4b
i40_g_bg	28484	"i4b (4, 40)"	640	photons/bin * 100	No	i_APID_AvFlg
i5_g_bg	29124	"i4b (4, 5)"	80	photons/bin * 100	No	i_APID_AvFlg
i1_g_bg	29204	i4b (4)	16	photons/bin * 100	No	i_APID_AvFlg
i_gPredCldTop	29220	i2b (5)	10	meters	No	i_APID_AvFlg
i_g_shot_ctr	29230	i2b	2	n/a	No	i_APID_AvFlg

Table B-2 GLA02 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_SpcmBg2Del	29232	i2b	2	nanoseconds	Yes	i_APID_AvFlg
i_SpcmRngDel	29234	i2b	2	nanoseconds	Yes	i_APID_AvFlg
i_SpcmGateDel	29236	i2b	2	nanoseconds	Yes	i_APID_AvFlg
i_SpcmBg1Del	29238	i2b	2	nanoseconds	Yes	i_APID_AvFlg
i_spcm_stat	29240	i2b	2	n/a	Yes	i_APID_AvFlg
i_g_TxNrg_Cts	29242	i1b (40)	40	counts	Yes	i_APID_AvFlg
i_g_TxNrg_qf	29282	i1b (10)	10	n/a	Yes	No
i_g_IntRet_qf	29292	i1b	1	n/a	Yes	No
i_spare2	29293	i1b	1	NA	No	No
i_ir_lid_qf	29294	i1b (12)	12	n/a	Yes	No
i_ir_shot_ctr	29306	i2b	2	n/a	No	i_APID_AvFlg
i_spcm_cts	29308	i1b (8)	8	n/a	Yes	i_APID_AvFlg
i_pc_rbias	29316	i4b	4	n/a	No	i_APID_AvFlg
i40_ir_TxNrgEU	29320	i4b (40)	160	Joules * 1.0d5	No	i_APID_AvFlg
i5_ir_TxNrgEU	29480	i4b (5)	20	Joules * 1.0d5	No	i_APID_AvFlg
i_rng2CDProf	29500	i4b	4	centimeters	No	i_APID_AvFlg
i40_ir_bg	29504	"i4b (4, 40)"	640	W*1.0d17	No	i_APID_AvFlg
i5_ir_bg	30144	"i4b (4, 5)"	80	W*1.0d17	No	i_APID_AvFlg
i40_ir_lid	30224	"i4b (148, 40)"	23680	(W*KM^2)/J)*1.0d8	No	gi_invalid_i4b
i5_ir_lid	53904	"i4b (132, 5)"	2640	(W*KM^2)/J)*10^8	No	gi_invalid_i4b
i_CdBg2_Del	56544	i2b	2	counts	Yes	i_APID_AvFlg
i_RngGate_De	56546	i2b	2	counts	Yes	i_APID_AvFlg
i_cd_bg1_del	56548	i2b	2	counts	Yes	i_APID_AvFlg
i_cd_det_stat	56550	i2b	2	n/a	Yes	i_APID_AvFlg
i_cd_rbias	56552	i4b	4	n/a	No	i_APID_AvFlg
i_cd_ad_out	56556	i1b	1	n/a	Yes	i_APID_AvFlg
i_cd_att_set	56557	i1b	1	n/a	Yes	i_APID_AvFlg
i_CldPkSig	56558	i1b (5)	5	photons / bin	No	i_APID_AvFlg
i_gndret_pksig	56563	i1b (5)	5	photons / bin	No	i_APID_AvFlg

**Table B-2 GLA02 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_gnd_ret_loc	56568	i1b (5)	5	bin number	No	i_APID_AvFlg
i_et_cal_mode	56573	i1b	1	n/a	No	i_APID_AvFlg
i_ir_TxNrg_qf	56574	i1b (10)	10	n/a	Yes	No
i_EtHtrC37j_c	56584	i2b	2	Amps X 100	No	i_APID_AvFlg
i_EtC37d_t	56586	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_ETsettleTime	56588	i2b	2	seconds	Yes	i_APID_AvFlg
i_et_Flags	56590	i1b	1	n/a	Yes	No
i_et_update_counter	56591	i1b	1	n/a	No	i_APID_AvFlg
i_et_StartTemp	56592	i1b	1	Celsius	No	i_APID_AvFlg
i_et_StopTemp	56593	i1b	1	Celsius	No	i_APID_AvFlg
i_et_TempStep	56594	i1b	1	Celsius	No	i_APID_AvFlg
i_et_spare	56595	i1b (3)	3	NA	No	N/A
i_et_acqavg_time	56598	i1b	1	seconds	No	No
i_spare6	56599	i1b	1	NA	No	No
i_et_temperr	56600	i4b	4	n/a	No	i_APID_AvFlg
i_ET_state	56604	i1b	1	N/A	No	i_APID_AvFlg
i_spare3	56605	i1b	1	NA	No	No
i_et_acqset_time	56606	i2b	2	seconds	Yes	i_APID_AvFlg
i_et_onax_xmit	56608	i4b	4	n/a	No	i_APID_AvFlg
i_et_offax_xmit	56612	i4b	4	n/a	No	i_APID_AvFlg
i_et_trkfltout	56616	i4b	4	n/a	No	i_APID_AvFlg
i_et_trkfltavg	56620	i4b	4	n/a	No	i_APID_AvFlg
i_APID_AvFlg	56624	i1b (8)	8	n/a	No	No
i_OrbFlg	56632	i1b (2)	2	NA	No	No
i_HoffMin	56634	i2b	2	meters	No	i_APID_AvFlg
i_Hsat	56636	i4b	4	centimeters	No	i_APID_AvFlg
i_4nsBgMean	56640	i4b (40)	160	counts	No	i_APID_AvFlg
i_4nsBgSDev	56800	i4b (40)	160	counts	No	i_APID_AvFlg

**Table B-2 GLA02 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_DualPinA	56960	i1b (40)	40	counts	Yes	i_APID_AvFlg
i_DualPinB	57000	i1b (40)	40	counts	Yes	i_APID_AvFlg
i_spare4	57040	i1b	1	NA	No	No
i_DitheringEnabledFlag	57041	i1b	1	N/A	NA	i_APID_AvFlg
i_timecorflg	57042	i2b	2	N/A	No	No
spare5	57044	i1b (12)	12	n/a	No	N/A
Total Bytes 57056						

**B.1.4 GLA03 - Engineering Data**

Records occur at once per 16 second rate and are fixed format.

**Table B-3 GLA03 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA03_MAIN; % of Granule: 100; Record Duration (seconds):16; Repeats: 1						
6.0 : Last Modified : Sun Jan 23 14:50:48 GMT-0500 (EST) 2011						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_phdr_20	12	"i1b (6, 4)"	24	N/A	No	i_APID_AvFlg
i_shdr_20	36	"i1b (8, 4)"	32	N/A	No	i_APID_AvFlg
i_g_nrg	68	i2b (4)	8	Percent X 100	No	i_APID_AvFlg
i_Lsr1Osc_t	76	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_Lsr1Dblr_t	84	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_LMB1Ref_t	92	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_L1Elec_t	100	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_LsrOsc_c	108	i2b (4)	8	Amps	No	i_APID_AvFlg
i_LsrAmp_c	116	i2b (4)	8	Amps	No	i_APID_AvFlg
i_LsrDr_pw	124	i2b (4)	8	pw in microsec	No	i_APID_AvFlg
i_Lsr2Osc_t	132	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_Lsr2Dblr_t	140	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_LMB2Ref_t	148	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_L2Elect_t	156	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_Lsr3Osc_t	164	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_Lsr3Dblr_t	172	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_LMB3Ref_t	180	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_L3Elect_t	188	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_PrimAD550v	196	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_SecAD550v	212	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_spcm1_550v	228	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_spcm2_550v	244	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_spcm3_550v	260	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_spcm4_550v	276	i4b (4)	16	Volts X 100	No	i_APID_AvFlg



**Table B-3 GLA03 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
i_spcm5_550v	292	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_spcm6_550v	308	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_spcm7_550v	324	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_spcm8_550v	340	i4b (4)	16	Volts X 100	No	i_APID_AvFlg
i_Int1_t	356	i2b (4)	8	Celsius	No	i_APID_AvFlg
i_ct_prail_v	364	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_Int3_t	372	i2b (4)	8	Celsius	No	i_APID_AvFlg
i_VCXmtr_c	380	i2b (4)	8	milliAmps	No	i_APID_AvFlg
i_VCYmtr_c	388	i2b (4)	8	milliAmps	No	i_APID_AvFlg
i_Xpos	396	i2b (4)	8	Volts	No	i_APID_AvFlg
i_Ypos	404	i2b (4)	8	Volts	No	i_APID_AvFlg
i_ADdetOutGn	412	i2b (4)	8	counts	No	i_APID_AvFlg
i_ADdetRetGn	420	i2b (4)	8	counts	No	i_APID_AvFlg
i_DPinA	428	i2b (4)	8	Percent X 100	No	i_APID_AvFlg
i_DPinB	436	i2b (4)	8	Percent X 100	No	i_APID_AvFlg
i_Laser1_stat	444	i1b (4)	4	N/A	No	i_APID_AvFlg
i_Laser2_stat	448	i1b (4)	4	N/A	No	i_APID_AvFlg
i_Laser3_stat	452	i1b (4)	4	N/A	No	i_APID_AvFlg
i_OTS_stat	456	i1b (4)	4	N/A	No	i_APID_AvFlg
i_phdr_21	460	"i1b (6, 4)"	24	N/A	No	i_APID_AvFlg
i_shdr_21	484	"i1b (8, 4)"	32	N/A	No	i_APID_AvFlg
i_BusAInst_28v	516	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_HBSupp_c	524	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_HVPSDetSup_c	540	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_OpHtr_c	556	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_MechSys_c	572	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_BusBL1_v	588	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_BusBL1_c	596	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_BusCL2_v	612	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_BusCL2_c	620	i4b (4)	16	Amps X 100	No	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
i_BusDL3_v	636	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_BusDL3_c	644	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_5VHb1_v	660	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_5VHb1_c	668	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_12VHb2_v	684	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_12VHb2_c	692	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_n12VHb3_v	708	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_n12VHb3_c	716	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_5VHb4_v	732	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_5VHb4_c	740	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_n5VHb5_v	756	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_n5VHb5_c	764	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_n5VHb6_v	780	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_n5VHb6_c	788	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_15VBPR_v	804	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_n15VBPR_v	812	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_12VPOscTC_c	820	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_12VSOscTC_c	836	i4b (4)	16	Amps X 100	No	i_APID_AvFlg
i_n2VDV_v	852	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_HbHS_t	860	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_FETsbHS_t	868	i2b (4)	8	Celsius X 100	No	i_APID_AvFlg
i_PrimOsc_Stat	876	i1b (4)	4	N/A	No	i_APID_AvFlg
i_SecOsc_Stat	880	i1b (4)	4	N/A	No	i_APID_AvFlg
i_PrimAD_Stat	884	i1b (4)	4	N/A	No	i_APID_AvFlg
i_SecAD_Stat	888	i1b (4)	4	N/A	No	i_APID_AvFlg
i_0VHVPSRef_v	892	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_5VHVPSRef_v	900	i2b (4)	8	Volts X 100	No	i_APID_AvFlg
i_OptSensSt	908	i2b (4)	8	N/A	No	i_APID_AvFlg
i_CmdTImStat	916	i2b (4)	8	N/A	No	i_APID_AvFlg

Table B-3 GLA03 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_PDUPMonCa l1	924	i1b (4)	4	N/A	No	i_APID_AvFlg
i_PDUPMonCa l2	928	i1b (4)	4	N/A	No	i_APID_AvFlg
i_PDUSMonCa l1	932	i1b (4)	4	N/A	No	i_APID_AvFlg
i_PDUSMonCa l2	936	i1b (4)	4	N/A	No	i_APID_AvFlg
i_ctrinfo	940	i1b (4)	4	Counts	No	i_APID_AvFlg
i_phdr_22	944	i1b (6)	6	N/A	No	i_APID_AvFlg
i_shdr_22	950	i1b (8)	8	N/A	No	i_APID_AvFlg
i_HkBdC0_t	958	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_IPSBdC1_t	960	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PCBdC2_t	962	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_CDFTBdC3_t	964	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_AD1DSPC4_t	966	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_AD2DSPC5_t	968	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_DCHBdC6_t	970	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_LMBdC7_t	972	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_TCMBdC8_t	974	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_OXCO1BdC9_t	976	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_OXCO2BdC10_t	978	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_OscBdC11_t	980	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_OTSBdC12_t	982	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_LPAC13_t1	984	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_LPAC14_t2	986	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_AD1eclC15_t	988	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_AD2eclC16_t	990	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_AD1eclC17_t	992	i2b	2	Celsius X 100	No	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_AD2eclbC18_t	994	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_AD1ADCC19_t	996	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_AD2ADCC20_t	998	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_lid_box_t	1000	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PRTtelmtC22_t	1002	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PRTtelbfC23t	1004	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PRTad1C24_t	1006	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PRTad2C25_t	1008	i2b	2	Celsius X 100	No	i_APID_AvFlg
iF1LTRSRSC26_t	1010	i2b	2	Celsius X 100	No	i_APID_AvFlg
iF2LTRSRSC27_t	1012	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_srs_ff_optio_t	1014	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PRTfboxC29_t	1016	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_F1fabC30_t	1018	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_F2fabC31_t	1020	i2b	2	Celsius X 100	No	i_APID_AvFlg
iF1LTRCRSC32_t	1022	i2b	2	Celsius X 100	No	i_APID_AvFlg
iF2LTRCRSC33_t	1024	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_SRSpaC34_t	1026	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PRTCaLC35_t	1028	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PRTCaLHC36_t	1030	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_PDBiasC38_v	1032	i2b	2	Volt X 100	No	i_APID_AvFlg
iAD1HSRamC39_t	1034	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_spare22_1	1036	i1b (12)	12	N/A	No	No
i_phdr_23	1048	i1b (6)	6	N/A	No	i_APID_AvFlg

Table B-3 GLA03 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_shdr_23	1054	i1b (8)	8	N/A	No	i_APID_AvFlg
i_tlm_spare1	1062	i1b (2)	2	n/a	No	No
i_lsm1_t	1064	i4b	4	Celsius X 100	No	i_APID_AvFlg
i_lsm2_t	1068	i4b	4	Celsius X 100	No	i_APID_AvFlg
i_adsm_t	1072	i4b	4	Celsius X 100	No	i_APID_AvFlg
i_lbsme_t	1076	i4b	4	Celsius X 100	No	i_APID_AvFlg
i_lbsmm_t	1080	i4b	4	Celsius X 100	No	i_APID_AvFlg
i_HOP1ActH1_c	1084	i4b	4	Amps X 100	No	i_APID_AvFlg
i_HOP1ActH2_c	1088	i4b	4	Amps X 100	No	i_APID_AvFlg
i_HOP2ActH1_c	1092	i4b	4	Amps X 100	No	i_APID_AvFlg
i_HOP2ActH2_c	1096	i4b	4	Amps X 100	No	i_APID_AvFlg
i_HOP3ActH1_c	1100	i4b	4	Amps X 100	No	i_APID_AvFlg
i_HOP3ActH2_c	1104	i4b	4	Amps X 100	No	i_APID_AvFlg
iTsPMirHtrStPt	1108	i2b	2	Celsius X 100	No	i_APID_AvFlg
iTsTwrHtrStPt	1110	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_EtHtr_StPt	1112	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_LHP1_StPt	1114	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_LHP2_StPt	1116	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_TsPMirHtr_St	1118	i1b	1	N/A	Yes	i_APID_AvFlg
i_TsTwrHtr_St	1119	i1b	1	N/A	Yes	i_APID_AvFlg
i_EtHtr_St	1120	i1b	1	N/A	Yes	i_APID_AvFlg
i_LHP1_St	1121	i1b	1	N/A	Yes	i_APID_AvFlg
i_LHP2_St	1122	i1b	1	N/A	Yes	i_APID_AvFlg
i_TsPMir_sTh	1123	i1b	1	N/A	Yes	i_APID_AvFlg
i_TsSecSS_sTh	1124	i1b	1	N/A	Yes	i_APID_AvFlg
i_TsSMir_sTh	1125	i1b	1	N/A	Yes	i_APID_AvFlg
i_LHP1_sTh	1126	i1b	1	N/A	Yes	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_LHP2_sTh	1127	i1b	1	N/A	Yes	i_APID_AvFlg
i_Et_sTh	1128	i1b	1	N/A	Yes	i_APID_AvFlg
i_tlm_spare2	1129	i1b	1	N/A	No	No
i_LHtP12_St	1130	i1b	1	N/A	No	i_APID_AvFlg
i_spare23_1	1131	i1b	1	n/a	No	No
i_phdr_50	1132	i1b (6)	6	N/A	No	i_APID_AvFlg
i_shdr_50	1138	i1b (8)	8	N/A	No	i_APID_AvFlg
i_TsPMir_t	1146	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_TsSMir_t	1148	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_TsTwr_t	1150	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_EtC37d_t	1152	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_LHP1C37e_t	1154	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_LHP2C37f_t	1156	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_TsPMirHDr_c	1158	i2b	2	Amps X 100	No	i_APID_AvFlg
i_TsTwrHDr_c	1160	i2b	2	Amps X 100	No	i_APID_AvFlg
i_EtHtrC37j_c	1162	i2b	2	Amps X 100	No	i_APID_AvFlg
i_DlyLineAll_t	1164	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_DlyLineMid_t	1166	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_DlyLineHi_t	1168	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_OTSL1_rb	1170	i1b	1	Counts	No	i_APID_AvFlg
i_OTSL2_rb	1171	i1b	1	Counts	No	i_APID_AvFlg
i_OTSL3_rb	1172	i1b	1	Counts	No	i_APID_AvFlg
i_OTSL4_rb	1173	i1b	1	Counts	No	i_APID_AvFlg
i_OTS_tc1	1174	i2b	2	Counts	No	i_APID_AvFlg
i_OTS_tc2	1176	i2b	2	Counts	No	i_APID_AvFlg
i_tlm_spare501	1178	i1b	1	n/a	No	No
i_spare50	1179	i1b (21)	21	N/A	No	No
i_phdr_24	1200	"i1b (6, 4)"	24	N/A	No	i_APID_AvFlg
i_shdr_24	1224	"i1b (8, 4)"	32	N/A	No	i_APID_AvFlg
iHS_CmdProc	1256	i1b (4)	4	counts	Yes	i_APID_AvFlg
iHS_CmdRej	1260	i1b (4)	4	counts	Yes	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
iCS_CmdProc	1264	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCS_CmdRej	1268	i1b (4)	4	counts	Yes	i_APID_AvFlg
ITC_CmdProc	1272	i1b (4)	4	counts	Yes	i_APID_AvFlg
ITC_CmdRej	1276	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSB_CmdProc	1280	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSB_CmdRej	1284	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSM_CmdProc	1288	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSM_CmdRej	1292	i1b (4)	4	counts	Yes	i_APID_AvFlg
iRT_CmdProc	1296	i1b (4)	4	counts	Yes	i_APID_AvFlg
iRT_CmdRej	1300	i1b (4)	4	counts	Yes	i_APID_AvFlg
iRT_RCH3Cmd Rcv	1304	i1b (4)	4	counts	Yes	i_APID_AvFlg
iRT_RCH3Cmd Rej	1308	i1b (4)	4	counts	Yes	i_APID_AvFlg
iMD_CmdProc	1312	i1b (4)	4	counts	Yes	i_APID_AvFlg
iMD_CmdRej	1316	i1b (4)	4	counts	Yes	i_APID_AvFlg
iAD_CmdProc	1320	i1b (4)	4	counts	Yes	i_APID_AvFlg
iAD_CmdRej	1324	i1b (4)	4	counts	Yes	i_APID_AvFlg
iAD_StatFlag	1328	i1b (4)	4	n/a	Yes	i_APID_AvFlg
i_tlm_spare24	1332	"i1b (3, 4)"	12	n/a	No	No
iCD_CCDProc	1344	i1b (4)	4	counts	No	i_APID_AvFlg
iCD_CCDRej	1348	i1b (4)	4	counts	No	i_APID_AvFlg
iCD_StatusFlag	1352	"i1b (2, 4)"	8	n/a	No	i_APID_AvFlg
iDC_CmdProc	1360	i1b (4)	4	counts	Yes	i_APID_AvFlg
iDC_CmdRej	1364	i1b (4)	4	counts	Yes	i_APID_AvFlg
iDC_StatFlag	1368	"i1b (2, 4)"	8	n/a	No	i_APID_AvFlg
iGP_CmdProc	1376	i1b (4)	4	counts	Yes	i_APID_AvFlg
iGP_CmdRej	1380	i1b (4)	4	counts	Yes	i_APID_AvFlg
iGP_StatFlag	1384	"i1b (2, 4)"	8	n/a	No	i_APID_AvFlg
iPC_CmdProc	1392	i1b (4)	4	counts	Yes	i_APID_AvFlg
iPC_CmdRej	1396	i1b (4)	4	counts	Yes	i_APID_AvFlg
iPC_StatFlag	1400	i2b (4)	8	n/a	Yes	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iCT_CmdProc	1408	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_CmdRej	1412	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_Mode	1416	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_phdr_25	1424	"i1b (6, 4)"	24	n/a	No	i_APID_AvFlg
i_shdr_25	1448	"i1b (8, 4)"	32	n/a	No	i_APID_AvFlg
i_HS_PrevMode	1480	i1b (4)	4	n/a	No	i_APID_AvFlg
i_HS_CurMode	1484	i1b (4)	4	n/a	No	i_APID_AvFlg
i_SubSysPres	1488	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iHS_WarmRCt	1496	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_ColdRCt	1504	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_MxWarmRCt	1512	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_ColdWarmF	1520	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iHS_OSResetF	1528	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iHS_OSTickCt	1536	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_HSExecCt	1544	i4b (4)	16	counts	No	i_APID_AvFlg
iHS_CSExecCt	1560	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_TCExecCt	1568	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_SBExecCt	1576	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_SMExecCt	1584	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_RTExecCt	1592	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_MDExecCt	1600	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_ADExecCt	1608	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_CDExecCt	1616	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_DCExecCt	1624	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_GPExecCt	1632	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_PCExecCt	1640	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_CTExecCt	1648	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHSFPU_Uflw_Ct	1656	i4b (4)	16	counts	No	i_APID_AvFlg
iHS_spare1	1672	i4b (4)	16	n/a	No	No



**Table B-3 GLA03 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
iHS_spare2	1688	i2b (4)	8	n/a	No	No
iHSTCfireIS-RCt	1696	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_RTISRCtLo	1704	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_spare3	1712	i2b (4)	8	n/a	No	No
iHS_CTISRCt	1720	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_spare4	1728	i2b (4)	8	n/a	No	No
iHS_spare5	1736	i2b (4)	8	n/a	No	No
iHS_ppslSRCt	1744	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_DC_ISRCt	1752	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_PC_ISRCt	1760	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_CD_ISRCt	1768	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_AD_ISRCt	1776	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_spare6	1784	i2b (4)	8	n/a	No	No
iHS_OSEventSeq	1792	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iHS_PeakCPU	1800	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iHS_LastCPU	1804	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iHSPCI_Bus_st	1808	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iHSOS_Plog_st	1812	i1b (4)	4	n/a	No	i_APID_AvFlg
iHSOS_Plog_ct	1816	i2b (4)	8	counts	Yes	i_APID_AvFlg
iHS_Plog_stAdd	1824	i4b (4)	16	n/a	No	i_APID_AvFlg
iHS_Plog_mask	1840	i4b (4)	16	n/a	No	i_APID_AvFlg
i_spare25_2	1856	"i1b (6, 4)"	24	n/a	No	No
iCS_StatFlag	1880	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iCS_codeErr_ct	1884	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCSEPROMerr_ct	1888	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCSTblRamerr_ct	1892	i1b (4)	4	counts	Yes	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
iCS_codeErr_ID	1896	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCSEPMerr_ID	1904	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCSTblRamErrID	1912	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCS_code_mstrcs	1920	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCSRam_mstrcs	1928	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCSEPM-mstrcs	1936	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iEPROM_bmem_cs	1944	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iEPROM_mem_cs	1952	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iPROM_mem_cs	1960	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCS_spare	1968	"i1b (18, 4)"	72	n/a	No	No
iTC_MET_u2	2040	"i1b (2, 4)"	8	n/a	No	i_APID_AvFlg
iTC_MET_I4	2048	"i1b (4, 4)"	16	n/a	No	i_APID_AvFlg
iTC_FcmdInc_u2	2064	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iTC_FcmdInc_I4	2072	i4b (4)	16	n/a	No	i_APID_AvFlg
iTCworkMET_sec	2088	i4b (4)	16	seconds	No	i_APID_AvFlg
iTCworkMET_us	2104	i4b (4)	16	microseconds	No	i_APID_AvFlg
i_spare25_3	2120	"i1b (18, 4)"	72	n/a	No	No
i_SB_SndErrCnt	2192	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_SB_RcvErrCnt	2196	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_SB_OSErrCnt	2200	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSB_QFullErrCt	2204	i1b (4)	4	counts	Yes	i_APID_AvFlg

Table B-3 GLA03 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iSB_BOverErr Ct	2208	i2b (4)	8	counts	Yes	i_APID_AvFlg
i_SB_LBO_Str m	2216	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_SB_LBO_Pip e	2224	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_SB_LBO_Tas k	2232	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_SB_LQF_Str m	2240	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_SB_LQF_Pip e	2248	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_SB_LQF_Tas k	2256	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_SB_Spare	2264	"i1b (8, 4)"	32	n/a	No	No
iSMRemDump-Copy	2296	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSM_Dump_flg	2300	i1b (4)	4	n/a	No	i_APID_AvFlg
iSM_TblOps_fg	2304	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iSM_TOp_lmg Typ	2308	i1b (4)	4	n/a	No	i_APID_AvFlg
iSM_TblID_sel	2312	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iSM_TblSize	2320	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iSM_TblCksum	2328	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iSM_success_c t	2336	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSM_fail_ct	2340	i1b (4)	4	counts	Yes	i_APID_AvFlg
iSM_TblWdLd_ct	2344	i2b (4)	8	counts	Yes	i_APID_AvFlg
iSM_FSW_Bld Num	2352	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iSM_FSW_Ver Num	2356	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iSM_Spares	2360	"i1b (10, 4)"	40	n/a	No	No
iBCRT_CntrlR Wd	2400	i2b (4)	8	n/a	Yes	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iBCRT_StatReg	2408	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iBCRT_IntStReg	2416	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iRT_MsgErr	2424	i2b (4)	8	counts	Yes	i_APID_AvFlg
iRT_RtryCt	2432	i2b (4)	8	counts	Yes	i_APID_AvFlg
iRT_InvCmd	2440	i1b (4)	4	counts	Yes	i_APID_AvFlg
iRT_InvBCCmd	2444	i1b (4)	4	counts	Yes	i_APID_AvFlg
iRT_ModeCodeCt	2448	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_spare25_4	2452	i1b (4)	4	n/a	No	No
iRT_RcvRCH1_ct	2456	i2b (4)	8	counts	Yes	i_APID_AvFlg
iRT_RejRCH1_ct	2464	i2b (4)	8	counts	Yes	i_APID_AvFlg
iRT_SentXCH1ct	2472	i2b (4)	8	counts	Yes	i_APID_AvFlg
iRT_SentXCH2ct	2480	i2b (4)	8	counts	Yes	i_APID_AvFlg
iRT_CmdHist_ct	2488	i2b (4)	8	counts	Yes	i_APID_AvFlg
iRT_cksum_st	2496	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_spare25_5	2504	"i1b (8, 4)"	32	n/a	No	No
iMD_Tbl_flg	2536	i1b (4)	4	n/a	Yes	No
iMD_spare	2540	i1b (4)	4	n/a	No	No
iMD_T1addct	2544	i2b (4)	8	Counts	Yes	No
iMD_T2addct	2552	i2b (4)	8	n/a	Yes	No
iMD_T1rate	2560	i2b (4)	8	Counts	Yes	No
iMD_T2rate	2568	i2b (4)	8	n/a	Yes	No
iMD_spare2	2576	"i1b (12, 4)"	48	n/a	No	No
i_phdr_55	2624	"i1b (6, 4)"	24	n/a	No	i_APID_AvFlg
i_shdr_55	2648	"i1b (8, 4)"	32	n/a	No	i_APID_AvFlg
iAD_SWErr_ct	2680	i2b (4)	8	counts	Yes	i_APID_AvFlg
iAD_HWErr_ct	2688	i2b (4)	8	counts	Yes	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iAD_Shot_ct	2696	i1b (4)	4	counts	Yes	i_APID_AvFlg
iAD_ShotCtSkip	2700	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iAD_Sync_flag	2704	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iAD_spare1	2708	"i1b (5, 4)"	20	n/a	No	No
iAD_DSPfire_ct	2728	i2b (4)	8	counts	Yes	i_APID_AvFlg
iADDSPalive_ct	2736	i2b (4)	8	counts	Yes	i_APID_AvFlg
iAD_AncPkt_ct	2744	i2b (4)	8	counts	Yes	i_APID_AvFlg
iAD_EngPkt_ct	2752	i2b (4)	8	counts	Yes	i_APID_AvFlg
iAD_SmSci_ct	2760	i2b (4)	8	counts	Yes	i_APID_AvFlg
iAD_LgSci_ct	2768	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDSPLoad-ProcCt	2776	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDSPMDump_ct	2784	i2b (4)	8	counts	Yes	i_APID_AvFlg
iADMLoadCmdErr	2792	i2b (4)	8	counts	Yes	i_APID_AvFlg
iADMDumpCmdErr	2800	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDSPcksum-Rate	2808	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iDSPcksumSW_st	2816	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iDSP_cksum_ct	2824	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDSP_BScksum_l	2832	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iDSPEPROMcs_l	2840	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iDSPRAMcksum_l	2848	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iDSP_BScksum_u	2856	i4b (4)	16	n/a	No	i_APID_AvFlg
iDSPEPROMcs_u	2872	i4b (4)	16	n/a	No	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iDSPRAMcksu m_u	2888	i4b (4)	16	n/a	No	i_APID_AvFlg
iAD_DSPsw_b num	2904	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iAD_DSPsw_v num	2908	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iAD_GPsrwin_ ct	2912	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDSP_Pcksuml	2920	i2b (4)	8	n/a	Yes	No
iDSP_Pcksumu	2928	i4b (4)	16	n/a	No	No
iDSP_autorese t	2944	i1b (4)	4	n/a	Yes	No
iAD_SWenable	2948	i1b (4)	4	n/a	Yes	No
iAD_DSPtroub	2952	"i1b (2, 4)"	8	n/a	No	No
iADmemT- Loaderr	2960	i1b (4)	4	n/a	No	No
iAD_FixGain	2964	i1b (4)	4	n/a	Yes	No
iAD_spare2	2968	i1b (4)	4	n/a	No	No
iCD_Swerr_ct	2972	i2b (4)	8	counts	Yes	i_APID_AvFlg
iCD_shot_ct	2980	i2b (4)	8	counts	Yes	i_APID_AvFlg
iCD_SciPkt_ct	2988	i2b (4)	8	counts	Yes	i_APID_AvFlg
iCD_EngPkt_ct	2996	i2b (4)	8	counts	Yes	i_APID_AvFlg
iCD_AncPkt_ct	3004	i2b (4)	8	counts	Yes	i_APID_AvFlg
iCDRGateRcv_ ct	3012	i2b (4)	8	counts	Yes	i_APID_AvFlg
iCD40ctrPkt_ct	3020	i2b (4)	8	counts	Yes	i_APID_AvFlg
i_spare55_1	3028	i2b (4)	8	n/a	No	No
iCD_BG1delay	3036	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCD_BG2delay	3044	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCD_Rgatedela y	3052	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_spare55_2	3060	"i1b (2, 4)"	8	n/a	No	No
iCD_rawADout	3068	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iCD_GPSLch_ 32l	3076	i4b (4)	16	n/a	No	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iCDfackLch_32l	3092	i4b (4)	16	n/a	No	i_APID_AvFlg
iCDfcmdLch_32l	3108	i4b (4)	16	n/a	No	i_APID_AvFlg
i_spare55_3	3124	i1b (4)	4	n/a	No	No
iCDfcmdLch_8m	3128	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iCDfackLch_8m	3132	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iCD_GPSLch_8m	3136	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iCD_dataRdyCtr	3140	i4b (4)	16	n/a	No	i_APID_AvFlg
iCD_intsrc	3156	i4b (4)	16	n/a	No	No
iCD_PWaccum	3172	i4b (4)	16	counts	Yes	No
iCD_PWLong	3188	i1b (4)	4	counts	Yes	No
iCD_PWshort	3192	i1b (4)	4	counts	Yes	No
iCD_PWmsb	3196	i1b (4)	4	counts	Yes	No
i_spare55_4	3200	i1b (4)	4	n/a	No	No
iDC_swFailct	3204	i2b (4)	8	Counts	Yes	No
iDC_shot_ct	3212	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDC_Xpos	3220	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iDC_Ypos	3224	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iDC_LPApkt_ct	3228	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDC_tmode_rate	3236	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iDC_pkt_ct	3244	i2b (4)	8	counts	Yes	i_APID_AvFlg
iDC_byte_ct	3252	i4b (4)	16	counts	No	i_APID_AvFlg
iDC_outbitrate	3268	i4b (4)	16	n/a	No	i_APID_AvFlg
iDC_IntReg	3284	i4b (4)	16	n/a	No	i_APID_AvFlg
iDC_CtlLchReg	3300	i4b (4)	16	n/a	No	i_APID_AvFlg
iDC_intMaskReg	3316	i4b (4)	16	n/a	No	i_APID_AvFlg
iDC_FIFO_reg	3332	i4b (4)	16	n/a	No	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
IDC_LPAgainReg	3348	i4b (4)	16	n/a	No	i_APID_AvFlg
iDC_LPACt_reg	3364	i4b (4)	16	n/a	No	i_APID_AvFlg
iDC_spares	3380	"i1b (8, 4)"	32	n/a	No	No
iGPS10secIntCt	3412	i2b (4)	8	counts	Yes	i_APID_AvFlg
iGPPosPktRcvCt	3420	i2b (4)	8	counts	Yes	i_APID_AvFlg
iGP_HskPkt_ct	3428	i2b (4)	8	counts	Yes	i_APID_AvFlg
iGP_AncPkt_ct	3436	i2b (4)	8	counts	Yes	i_APID_AvFlg
iGPS40bitReqCt	3444	i2b (4)	8	counts	Yes	i_APID_AvFlg
iGPS40bitRcvCt	3452	i2b (4)	8	counts	Yes	i_APID_AvFlg
iGP_BadXYZ_cnt	3460	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iGP_ToIXYZ_cnt	3468	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iGP_PktsSent	3476	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iGP_spares	3484	"i1b (22, 4)"	88	n/a	No	No
iPC_swerrct	3572	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iPC_shot_ct	3580	i2b (4)	8	counts	Yes	i_APID_AvFlg
iPC_SciPkt_ct	3588	i2b (4)	8	counts	Yes	i_APID_AvFlg
iPC_EngPkt_ct	3596	i2b (4)	8	counts	Yes	i_APID_AvFlg
iPC_AncPkt_ct	3604	i2b (4)	8	counts	Yes	i_APID_AvFlg
iPC_RDlyRcv_ct	3612	i2b (4)	8	counts	Yes	i_APID_AvFlg
iPC_SPCMDly	3620	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iPC_BG1Dly	3628	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iPC_BG2Dly	3636	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iPC_RGateDly	3644	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iPC_HW_stat	3652	i4b (4)	16	n/a	No	i_APID_AvFlg
IPC_SPCM_st	3668	i4b (4)	16	n/a	No	i_APID_AvFlg
iPC_DatRdyCtr	3684	i4b (4)	16	n/a	No	i_APID_AvFlg



Table B-3 GLA03 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iPCSPCMraw_1_4	3700	i4b (4)	16	counts	No	i_APID_AvFlg
iPCSPCMraw_5_8	3716	i4b (4)	16	counts	No	i_APID_AvFlg
iPCSPCM_DCycle	3732	i4b (4)	16	n/a	No	i_APID_AvFlg
iPC_spare1	3748	"i1b (2, 4)"	8	n/a	No	No
iC_BSCalXstart	3756	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iC_BSCalYstart	3764	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iF_BSCalXstart	3772	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iF_BSCalYstart	3780	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iC_BSCalXinc	3788	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iC_BSCalYinc	3796	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iF_BSCalXinc	3804	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iF_BSCalYinc	3812	i2b (4)	8	n/a	Yes	i_APID_AvFlg
iC_BSCalIntSec	3820	i2b (4)	8	seconds	Yes	i_APID_AvFlg
iF_BSCalIntSec	3828	i2b (4)	8	seconds	Yes	i_APID_AvFlg
i_BSCalXbest	3836	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_BSCalYbest	3844	i2b (4)	8	n/a	Yes	i_APID_AvFlg
i_BSCal_remSec	3852	i2b (4)	8	seconds	Yes	i_APID_AvFlg
i_spare55_5	3860	"i1b (10, 4)"	40	n/a	No	No
iCT_state	3900	i1b (4)	4	n/a	No	i_APID_AvFlg
iCTCmdEcho-ErrCt	3904	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_LMBCmdRcvCt	3908	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_TMBCmdRcvCt	3912	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_MCBCmdRcvCt	3916	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_HKBCmdRcvCt	3920	i1b (4)	4	counts	Yes	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
i_HVPSCmdRcvCt	3924	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_PDUcmdRcvCt	3928	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_HWtlm1Pkt_ct	3932	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_HWtlm2Pkt_ct	3936	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_HWtlm3Pkt_ct	3940	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_HWtlm4Pkt_ct	3944	i1b (4)	4	counts	Yes	i_APID_AvFlg
i_HWtlm5Pkt_ct	3948	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCtdwellPkt_ct	3952	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_AncPkt_ct	3956	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_timeout_ct	3960	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_int_ct	3964	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_ShotCtErr	3968	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_dwell_mode	3972	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iCT_dwell_chnl	3976	i1b (4)	4	n/a	Yes	i_APID_AvFlg
iCTLMBmuxErrCt	3980	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCTHKBmuxErrCt	3984	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCTHKBsmxErrCt	3988	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCTTCBmuxErrCt	3992	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCTMCBmux-ErrCt	3996	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCTHVPSmux-ErrCt	4000	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCTPDUMuxErrCt	4004	i1b (4)	4	counts	Yes	i_APID_AvFlg
iCT_CEchoSucCt	4008	i1b (4)	4	counts	Yes	i_APID_AvFlg

Table B-3 GLA03 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iCT_SupErrflag	4012	i2b (4)	8	n/a	Yes	No
iCT_LHP1tcstat	4020	i1b (4)	4	n/a	Yes	No
iCT_LHP2tcstat	4024	i1b (4)	4	n/a	Yes	No
iCT_LHP1tsp	4028	i1b (4)	4	n/a	Yes	No
iCT_LHP2tsp	4032	i1b (4)	4	n/a	Yes	No
iCT_LHP1tcctr	4036	i1b (4)	4	n/a	Yes	No
iCT_LHP2tcctr	4040	i1b (4)	4	n/a	Yes	No
iCT_LHP1_Tmin	4044	i1b (4)	4	n/a	Yes	No
iCT_LHP2_Tmin	4048	i1b (4)	4	n/a	Yes	No
iCT_LHP1_Tdelta	4052	i1b (4)	4	n/a	Yes	No
iCT_LHP2_Tdelta	4056	i1b (4)	4	n/a	Yes	No
iCT_LHP1_Tcycle	4060	i1b (4)	4	n/a	Yes	No
iCT_LHP2_Tcycle	4064	i1b (4)	4	n/a	Yes	No
iCT_miscFlag	4068	i1b (4)	4	n/a	Yes	No
ICT_spares	4072	"i1b (11, 4)"	44	n/a	No	No
i_phdr_ad	4116	"i1b (6, 64)"	384	n/a	No	i_APID_AvFlg
i_shdr_ad	4500	"i1b (8, 64)"	512	n/a	No	i_APID_AvFlg
i_phdr_15	5012	"i1b (6, 16)"	96	n/a	No	i_APID_AvFlg
i_shdr_15	5108	"i1b (8, 16)"	128	n/a	No	i_APID_AvFlg
i_phdr_17	5236	"i1b (6, 16)"	96	n/a	No	i_APID_AvFlg
i_shdr_17	5332	"i1b (8, 16)"	128	n/a	No	i_APID_AvFlg
i_phdr_19	5460	"i1b (6, 16)"	96	n/a	No	i_APID_AvFlg
i_shdr_19	5556	"i1b (8, 16)"	128	n/a	No	i_APID_AvFlg
i_sctr_19	5684	i2b (16)	32	counts	Yes	i_APID_AvFlg
i_chin_flag	5716	i1b (16)	16	n/a	No	i_APID_AvFlg
i_RMS_loc	5732	i4b (16)	64	ns	No	i_APID_AvFlg
i_sctrPDlyWF	5796	i4b (16)	64	counts	No	i_APID_AvFlg
i_dlaywf_start	5860	i4b (16)	64	ns	No	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_PDlyWf	5924	"i1b (32, 16)"	512	counts	Yes	i_APID_AvFlg
i_otswf_start	6436	i4b (16)	64	ns	No	i_APID_AvFlg
i_sctrOTSWf	6500	"i4b (4, 16)"	256	counts	No	i_APID_AvFlg
i_OTSPWf	6756	"i1b (128, 16)"	2048	counts	Yes	i_APID_AvFlg
i_cTx_win_loc	8804	i4b (16)	64	ns	No	i_APID_AvFlg
i_cNumNoTxin g	8868	i4b (16)	64	counts	No	i_APID_AvFlg
i_spare19_1	8932	i1b (16)	16	n/a	No	No
i_cTxThresh	8948	i2b (16)	32	counts	No	i_APID_AvFlg
i_cRwinSf	8980	"i4b (24, 16)"	1536	n/a	No	i_APID_AvFlg
i_cBgCoeff	10516	"i4b (18, 16)"	1152	n/a	No	i_APID_AvFlg
i_spare19_2	11668	i1b (16)	16	n/a	No	No
i_cEnAGC	11684	i1b (16)	16	n/a	No	i_APID_AvFlg
i_cEnAGC_4	11700	i1b (16)	16	n/a	No	i_APID_AvFlg
i_cRetGn	11716	i1b (16)	16	n/a	Yes	i_APID_AvFlg
i_cAGC_A	11732	"i4b (4, 16)"	256	n/a	No	i_APID_AvFlg
i_cAGC_B	11988	"i4b (4, 16)"	256	n/a	No	i_APID_AvFlg
i_cAGC_C	12244	"i4b (2, 16)"	128	n/a	No	i_APID_AvFlg
i_cAGC_Gmax	12372	i1b (16)	16	n/a	Yes	i_APID_AvFlg
i_cAGC_Gmin	12388	i1b (16)	16	n/a	Yes	i_APID_AvFlg
i_cAGC_Ginit	12404	i1b (16)	16	n/a	Yes	i_APID_AvFlg
i_cAGC_Zmax	12420	i4b (16)	64	n/a	No	i_APID_AvFlg
i_cAGC_Zmin	12484	i4b (16)	64	n/a	No	i_APID_AvFlg
i_cAGC_Vref	12548	i4b (16)	64	n/a	No	i_APID_AvFlg
i_cAGC_Vmin	12612	i1b (16)	16	n/a	Yes	i_APID_AvFlg
i_cFiltCTol	12628	i4b (16)	64	n/a	No	i_APID_AvFlg
i_cRwinDOff	12692	"i4b (6, 16)"	384	counts	No	i_APID_AvFlg
i_cRetFThr	13076	"i1b (6, 16)"	96	n/a	Yes	i_APID_AvFlg
i_spare_tlm21	13172	"i1b (2, 16)"	32	n/a	No	No
i_cFIRCoeff	13204	"i1b (8, 16)"	128	n/a	Yes	i_APID_AvFlg
i_FWminStDev	13332	i4b (16)	64	n/a	No	i_APID_AvFlg

Table B-3 GLA03 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_FNzMinThr	13396	"i4b (6, 16)"	384	n/a	No	i_APID_AvFlg
i_FRejMskLead	13780	i4b (16)	64	n/a	No	No
i_FRejMskTrail	13844	i4b (16)	64	n/a	No	No
i_spare19_3	13908	"i1b (22, 16)"	352	n/a	No	No
i_shotctr_40	14260	"i2b (40, 16)"	1280	n/a	Yes	No
i_fack_time	15540	"i1b (200, 16)"	3200	n/a	Yes	No
i_fcnd_time	18740	"i1b (200, 16)"	3200	n/a	Yes	No
i_calcSClat	21940	i2b (16)	32	Degrees	No	i_APID_AvFlg
i_calcSClon	21972	i2b (16)	32	Degrees	No	i_APID_AvFlg
i_Hsat	22004	i4b (16)	64	meters	No	i_APID_AvFlg
i_Rsat	22068	i4b (16)	64	meters	No	i_APID_AvFlg
i_Rmin	22132	i4b (16)	64	meters	No	i_APID_AvFlg
i_Rmax	22196	i4b (16)	64	meters	No	i_APID_AvFlg
i_Wmin	22260	i4b (16)	64	meters	No	i_APID_AvFlg
i_Wmax	22324	i4b (16)	64	meters	No	i_APID_AvFlg
i_Hoffmin	22388	i4b (16)	64	meters	No	i_APID_AvFlg
i_Hoffmax	22452	i4b (16)	64	meters	No	i_APID_AvFlg
i_Rbmin	22516	i4b (16)	64	meters	No	i_APID_AvFlg
i_Rbmax	22580	i4b (16)	64	meters	No	i_APID_AvFlg
i_ObSurfType	22644	i1b (16)	16	n/a	No	i_APID_AvFlg
i_PosDatFlg	22660	i1b (16)	16	n/a	Yes	i_APID_AvFlg
i_SCPoS Pkt	22676	"i1b (40, 16)"	640	n/a	Yes	i_APID_AvFlg
i_SCPoS PktShot	23316	i2b (16)	32	n/a	No	i_APID_AvFlg
i_SCPoS PktGMET	23348	"i1b (6, 16)"	96	n/a	Yes	i_APID_AvFlg
i_DEMmin	23444	i1b (16)	16	meters	Yes	i_APID_AvFlg
i_DEMmax	23460	i1b (16)	16	meters	Yes	i_APID_AvFlg
i_RngDatSrc	23476	i1b (16)	16	n/a	Yes	i_APID_AvFlg
i_FTLatch	23492	"i1b (5, 16)"	80	counts	No	i_APID_AvFlg
i_GPSppsGMT	23572	"i1b (6, 16)"	96	counts	No	i_APID_AvFlg

**Table B-3 GLA03 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/Flag
i_spare19_4	23668	"i1b (8, 16)"	128	n/a	No	No
i_et_cal_mode	23796	i1b (16)	16	n/a	No	i_APID_AvFlg
i_ET_state	23812	i1b (16)	16	n/a	No	i_APID_AvFlg
i_ETsettleTime	23828	i1b (16)	16	seconds	Yes	i_APID_AvFlg
i_ET_Flags	23844	i1b (16)	16	n/a	Yes	No
i_et_onax_xmit	23860	i4b (16)	64	n/a	No	i_APID_AvFlg
i_et_offax_xmit	23924	i4b (16)	64	n/a	No	i_APID_AvFlg
i_et_temperr	23988	i4b (16)	64	n/a	No	i_APID_AvFlg
i_et_trkfltout	24052	i4b ( 16)	64	n/a	No	i_APID_AvFlg
i_et_trkfltavg	24116	i4b (16)	64	n/a	No	i_APID_AvFlg
i_et_StartTemp	24180	i1b (16)	16	celsius	No	i_APID_AvFlg
i_et_StopTemp	24196	i1b (16)	16	celsius	No	i_APID_AvFlg
i_et_TempStep	24212	i1b (16)	16	celsius	No	i_APID_AvFlg
i_et_acqavg_tm	24228	i1b (16)	16	seconds	No	No
i_et_acqset_tm	24244	i2b (16)	32	seconds	No	i_APID_AvFlg
i_et_update_ctr	24276	i1b (16)	16	n/a	No	i_APID_AvFlg
i_et_spare	24292	i1b (16)	16	n/a	No	No
i_DualPinA	24308	"i1b (40, 16)"	640	counts	Yes	i_APID_AvFlg
i_DualPinB	24948	"i1b (40, 16)"	640	counts	Yes	i_APID_AvFlg
i_532nrg	25588	"i1b (40, 16)"	640	n/a	Yes	i_APID_AvFlg
i_APID_AvFlg	26228	"i1b (8, 16)"	128	n/a	No	No
i_timecorflg	26356	i2b	2	N/A	No	No
i_spare4	26358	i1b (78)	78	n/a	No	No
Total Bytes 26436						

**B.1.5 GLA04-01 - GLA04 LPA**

Records occur at once per second and are fixed format.

**Table B-4 GLA04-01 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA04_LPA_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: null						
6.0 : Last Modified : Fri Dec 10 09:56:19 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_dShotTime	12	i4b (39)	156	microseconds	No	No
i_shot_cntr	168	i2b (40)	80	counts	Yes	i_APID_AvFlg
i_GPSSLatch	248	i4b (2)	8	"seconds, microseconds"	Yes	i_APID_AvFlg
i_boxX	256	i1b (40)	40	counts	No	i_APID_AvFlg
i_boxY	296	i1b (40)	40	counts	No	i_APID_AvFlg
i_PixInt	336	"i1b (400, 40)"	16000	counts	Yes	i_APID_AvFlg
i_tx_wf	16336	"i1b (48, 40)"	1920	counts	Yes	i_APID_AvFlg
i_time_txWfPk	18256	i4b (40)	160	ns	No	i_APID_AvFlg
i_TxWfStart	18416	i4b (40)	160	ns	No	i_APID_AvFlg
i_txWfPk_Flag	18576	i1b (40)	40	n/a	No	i_APID_AvFlg
i_lpa_spare0	18616	i1b (120)	120	n/a	No	No
i_APID_AvFlg	18736	i1b (8)	8	n/a	No	No
i_timecorflg	18744	i2b	2	N/A	No	No
i_lpa_spare1	18746	i1b (6)	6	n/a	No	No
Total Bytes 18752						

**B.1.6 GLA04-02 - GLA04 LRS**

Records are fixed length and format and occur once per second.

**Table B-5 GLA04-02 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA04_LRS_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: 1						
6.0 : Last Modified : Fri Dec 10 10:36:12 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microsec- onds"	No	No
i_samp_time	12	"i4b (2, 10)"	80	"seconds,microsec- onds"	No	No
i_shot_time	92	"i4b (2, 10)"	80	seconds microseconds	No	No
i_shot_ctr	172	i4b ( 10)	40	counts	Yes	No
i_lrs_vtcw	212	"i4b (2, 10)"	80	"seconds, microsec- onds"	No	i_APID_AvFlg
i_lrs_timetag	292	i4b (10)	40	Microseconds	No	i_APID_AvFlg
i_lrs_msginc	332	i1b (10)	10	N/A	No	i_APID_AvFlg
i_lrs_flag	342	i1b ( 10)	10	N/A	No	No
i_lrs_TkrMode	352	i1b (10)	10	N/A	No	i_APID_AvFlg
i_lrs_tspare2	362	i1b (10)	10	N/A	No	No
i_lrs_DiagStat	372	i1b (10)	10	N/A	No	i_APID_AvFlg
i_lrs_LastPCm d	382	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_lrs_RollCt	392	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_lrs_tspare3	402	i1b (10)	10	N/A	No	No
i_lrs_VTkrSt	412	"i1b (3, 10)"	30	N/A	Yes	i_APID_AvFlg
i_lrs_stat	442	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_lrs_TimeMar k	452	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_lrs_CamID	462	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_lrs_swVID	472	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_LPAC13_t1	482	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_Vtstarvalid	484	"i1b (3, 10)"	30	N/A	No	i_APID_AvFlg
i_lrs_tspare4	514	i1b (30)	30	N/A	No	No
i_VTEEnergy	544	"i2b (3, 10)"	60	N/A	No	i_APID_AvFlg



Table B-5 GLA04-02 Record Format

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_VTBgBias	604	"i2b (3, 10)"	60	N/A	No	i_APID_AvFlg
i_VTCentR	664	"i4b (3, 10)"	120	Arc-seconds*1.0d6	Yes	i_APID_AvFlg
i_VTCentC	784	"i4b (3, 10)"	120	Arc-seconds*1.0d6	Yes	i_APID_AvFlg
i_lrsTimCofInt	904	i4b ( 10)	40	Microseconds	No	i_APID_AvFlg
i_lrs_RawRow	944	"i2b (3, 10)"	60	pixels	Yes	i_APID_AvFlg
i_lrs_RawCol	1004	"i2b (3, 10)"	60	pixels	Yes	i_APID_AvFlg
i_lrs_TrkThr	1064	"i1b (3, 10)"	30	N/A	Yes	i_APID_AvFlg
i_lrs_AcqThr	1094	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_lrs_FOVEdge	1104	i1b (10)	10	N/A	Yes	i_APID_AvFlg
iF1LTRSRSC26_t	1114	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_lrs_IntTime	1116	i2b (10)	20	milliseconds	Yes	i_APID_AvFlg
i_lrs_FrmCtr	1136	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_lrs_tspare7	1156	"i1b (4, 10)"	40	N/A	No	No
i_lrs_ccdtemp	1196	i2b	2	Celsius*100	No	i_APID_AvFlg
i_lrs_lenscellt	1198	i2b	2	Celsius*100	No	i_APID_AvFlg
i_trkr_subject	1200	i1b	1	null	Yes	No
i_spare	1201	i1b (3)	3	null	No	No
i_T0_shot_no	1204	i4b	4	NA	Yes	No
i_T0_frame	1208	i2b (5)	10	n/a	Yes	gi_invalid_i4b
i_T0_SA	1218	"i2b (256, 5)"	2560	null	Yes	No
i_lrs_spare2	3778	i1b (2)	2	NA	No	N/A
i_T1_shot_no	3780	i4b	4	counts	Yes	No
i_T1_frame	3784	i2b (4)	8	counts	Yes	gi_invalid_i2b
i_T1_SA	3792	"i2b (256, 4)"	2048	null	Yes	No
i_T2_shot_no	5840	i4b	4	null	Yes	No
i_T2_frame	5844	i2b	2	counts	Yes	gi_invalid_i4b
i_T2_SA	5846	i2b (256)	512	null	Yes	No
i_APID_AvFlg	6358	i1b (8)	8	n/a	No	No
i_timecorflg	6366	i2b	2	N/A	No	No

**Table B-5 GLA04-02 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
iF2LTRSRSC27_t	6368	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_TsPMir_t	6370	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_TsSMir_t	6372	i2b	2	Celsius X 100	No	i_APID_AvFlg
i_srs_ff_optio_t	6374	i2b	2	Celsius X 100	No	i_APID_AvFlg
Total Bytes 6376						

**B.1.7 GLA04-03 - GLA04 GYRO**

Records are fixed length and format and occur once per second.

**Table B-6 GLA04-03 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA04_GYR_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: 1						
6.0 : Last Modified : Wed Dec 01 10:40:40 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_samp_time	12	"i4b (2, 10)"	80	"seconds,microseconds"	No	gi_invalid_i4b
i_siru_vtcw	92	"i4b (2, 10)"	80	"seconds, microseconds"	No	i_APID_AvFlg
i_siru_valdata	172	i2b (10)	20	n/a	Yes	i_APID_AvFlg
i_siru_AIA	192	i2b (10)	20	Arc-Seconds*20	Yes	i_APID_AvFlg
i_siru_BIA	212	i2b (10)	20	Arc-Seconds*20	Yes	i_APID_AvFlg
i_siru_CIA	232	i2b (10)	20	Arc-Seconds*20	Yes	i_APID_AvFlg
i_siru_DIA	252	i2b (10)	20	Arc-Seconds*20	Yes	i_APID_AvFlg
i_siru_ttag	272	i4b (10)	40	Microseconds	No	i_APID_AvFlg
i_siru_config	312	i2b (10)	20	n/a	Yes	i_APID_AvFlg
i_APID_AvFlg	332	i1b (8)	8	n/a	No	No
i_timecorflg	340	i2b	2	N/A	No	No
i_gyro_spare1	342	i1b (6)	6	n/a	No	No
Total Bytes 348						

**B.1.8 GLA04-04 - GLA04 IST**

Records are fixed length and format and occur once per second.

**Table B-7 GLA04-04 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA04_IST_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: null						
6.0 : Last Modified : Fri Dec 10 09:25:22 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_samp_time	12	"i4b (2, 10)"	80	"seconds,microseconds"	No	gi_invalid_i4b
i_shot_time	92	"i4b (2, 10)"	80	seconds microseconds	Yes	No
i_shot_ctr	172	i4b (10)	40	counts	Yes	No
i_ist_vtcw	212	"i4b (2, 10)"	80	seconds microseconds	No	i_APID_AvFlg
i_ist_timetag	292	i4b (10)	40	Microseconds	No	i_APID_AvFlg
i_ist_msginc	332	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_RollCt	342	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_TkrMode	352	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_tspare1	362	i1b (10)	10	N/A	No	No
i_ist_DiagStat	372	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_LastPCmd	382	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_VTkrSt	392	"i1b (6, 10)"	60	N/A	Yes	i_APID_AvFlg
i_ist_stat	452	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_TimeMark	462	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_CamID	472	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_swVID	482	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_ist_flag	492	i1b (10)	10	N/A	No	No
i_ist_spare1	502	i1b (2)	2	N/A	No	No
i_Vtstarvalid	504	"i1b (6, 10)"	60	N/A	Yes	i_APID_AvFlg
i_VTEEnergy	564	"i2b (6, 10)"	120	N/A	No	i_APID_AvFlg
i_VTBgBias	684	"i2b (6, 10)"	120	N/A	No	i_APID_AvFlg
i_VTStarMag	804	"i2b (6, 10)"	120	star magnitude*10	No	i_APID_AvFlg

**Table B-7 GLA04-04 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_VTBoreH	924	"i4b (6, 10)"	240	Arc-seconds*100	No	i_APID_AvFlg
i_VTBoreV	1164	"i4b (6, 10)"	240	Arc-seconds*100	No	i_APID_AvFlg
i_ist_FocLngth	1404	i4b (10)	40	Microns * 100	No	i_APID_AvFlg
i_istTimCofInt	1444	i4b (10)	40	Microseconds	No	i_APID_AvFlg
i_ist_BoreCol	1484	i4b (10)	40	N/A	No	i_APID_AvFlg
i_ist_BoreRow	1524	i4b (10)	40	N/A	No	i_APID_AvFlg
i_ist_CCDTemp	1564	i2b (10)	20	Celsius*100	No	i_APID_AvFlg
i_istLensCellT	1584	i2b (10)	20	Celsius*100	No	i_APID_AvFlg
i_APID_AvFlg	1604	i1b (8)	8	n/a	No	No
i_timecorflg	1612	i2b	2	N/A	No	No
i_ist_spare2	1614	i1b (6)	6	n/a	No	No
Total Bytes 1620						

**B.1.9 GLA04-05 - GLA04 BST**

Records are fixed length and format and occur once per second.

**Table B-8 GLA04-05 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA04_BST_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: null						
6.0 : Last Modified : Wed Dec 01 09:01:34 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_bst1_samp_time	12	"i4b (2, 10)"	80	"seconds,microseconds"	No	No
i_bst1_vtcw	92	"i4b (2, 10)"	80	Microseconds	No	i_APID_AvFlg
i_bst1_pchstat	172	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst1_datlat	192	i4b (10)	40	Microseconds	No	i_APID_AvFlg
i_bst1_sw1	232	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst1_sw2	252	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst1_mctr	272	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst1_recctr	292	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst1_rejctr	302	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst1_starX	312	"i4b (5, 10)"	200	Arc-SecondsX100	No	i_APID_AvFlg
i_bst1_starY	512	"i4b (5, 10)"	200	Arc-SecondsX100	No	i_APID_AvFlg
i_bst1_starInt	712	"i4b (5, 10)"	200	Magnitude*100	No	i_APID_AvFlg
i_bst1_ccdtemp	912	i2b (10)	20	Celsius* 100	No	i_APID_AvFlg
i_bst1_bptemp	932	i2b (10)	20	Celsius* 100	No	i_APID_AvFlg
i_bst1_lenstm	952	i2b (10)	20	Celsius* 100	No	i_APID_AvFlg
i_bst1_8V	972	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst1_n9V	982	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst1_4V	992	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst1_n5V	1002	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst1_BG	1012	i2b (10)	20	N/A	No	i_APID_AvFlg
i_bst1_srchct	1032	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst1_Fact	1042	i1b (10)	10	N/A	Yes	i_APID_AvFlg

**Table B-8 GLA04-05 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_bst1_sernum	1052	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst1_swver	1062	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst1_cancod e	1072	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst_spare1	1092	i1b (8)	8	n/a	No	No
i_bst2_samp_t ime	1100	"i4b (2, 10)"	80	"seconds, microsec- onds"	Yes	No
i_bst2_vtcw	1180	"i4b (2, 10)"	80	Microseconds	No	i_APID_AvFlg
i_bst2_pchstat	1260	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst2_datlat	1280	i4b (10)	40	Microseconds	No	i_APID_AvFlg
i_bst2_sw1	1320	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst2_sw2	1340	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst2_mctr	1360	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_bst2_recctr	1380	i1b ( 10)	10	N/A	Yes	i_APID_AvFlg
i_bst2_rejctr	1390	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst2_starX	1400	"i4b (5, 10)"	200	Arc-Seconds*100	No	i_APID_AvFlg
i_bst2_starY	1600	"i4b (5, 10)"	200	Arc-Seconds*100	No	i_APID_AvFlg
i_bst2_starInt	1800	"i4b (5, 10)"	200	Magnitude*100	No	i_APID_AvFlg
i_bst2_ccdtem p	2000	i2b (10)	20	Celsius* 100	No	i_APID_AvFlg
i_bst2_bptemp	2020	i2b (10)	20	Celsius* 100	No	i_APID_AvFlg
i_bst2_lenstm p	2040	i2b (10)	20	Celsius* 100	No	i_APID_AvFlg
i_bst2_8V	2060	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst2_n9V	2070	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst2_4V	2080	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst2_n5V	2090	i1b (10)	10	Volt * 10	No	i_APID_AvFlg
i_bst2_BG	2100	i2b (10)	20	N/A	No	i_APID_AvFlg
i_bst2_srchct	2120	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst2_Fact	2130	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst2_sernum	2140	i1b (10)	10	N/A	Yes	i_APID_AvFlg
i_bst2_swver	2150	i1b (10)	10	N/A	Yes	i_APID_AvFlg

**Table B-8 GLA04-05 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_bst2_cancod e	2160	i2b (10)	20	N/A	Yes	i_APID_AvFlg
i_APID_AvFlg	2180	i1b (8)	8	n/a	No	No
i_timecorflg	2188	i2b	2	N/A	No	No
i_bst_spare2	2190	i1b (6)	6	n/a	No	No
Total Bytes 2196						



**B.1.10 GLA04-06 - GLA04-SCPA**

Records are fixed length and format and occur once per second.

**Table B-9 GLA04-06 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA04_SCP_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: null						
6.0 : Last Modified : Fri Dec 10 10:37:46 GMT-0500 (EST) 2010						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_samp_time	12	i4b (2)	8	seconds microseconds	NA	No
i_scpa_vtcw	20	i4b (2)	8	"seconds, microseconds"	No	i_APID_AvFlg
i_CFA_Q1	28	i4b	4	N/A	No	i_APID_AvFlg
i_CFA_Q2	32	i4b	4	N/A	No	i_APID_AvFlg
i_CFA_Q3	36	i4b	4	N/A	No	i_APID_AvFlg
i_CFA_Q4	40	i4b	4	N/A	No	i_APID_AvFlg
i_ECIOrb_Pos X	44	i4b	4	meters	No	i_APID_AvFlg
i_ECIOrb_Pos Y	48	i4b	4	meters	No	i_APID_AvFlg
i_ECIOrb_Pos Z	52	i4b	4	meters	No	i_APID_AvFlg
i_ECIOrb_Vel X	56	i4b	4	cm/sec	No	i_APID_AvFlg
i_ECIOrb_Vel Y	60	i4b	4	cm/sec	No	i_APID_AvFlg
i_ECIOrb_VelZ	64	i4b	4	cm/sec	No	i_APID_AvFlg
i_SA_Pos1	68	i4b	4	radians*1.0E+6	No	i_APID_AvFlg
i_SA_Pos2	72	i4b	4	radians*1.0E+6	No	i_APID_AvFlg
i_gps_latch	76	i2b (3)	6	microseconds	Yes	No
i_gps_time	82	i4b	4	seconds	Yes	No
i_SA_CntrFlg1	86	i1b	1	n/a	Yes	No
i_SA_CntrFlg2	87	i1b	1	n/a	Yes	No
i_APID_AvFlg	88	i1b (8)	8	n/a	No	No
i_timecorflg	96	i2b	2	N/A	No	No
i_scpa_spare1	98	i1b (4)	4	n/a	No	No

**Table B-9 GLA04-06 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
Total Bytes 102						

**B.1.11 GLA05 - Waveform-based Elevation**

Records are fixed length and format and occur once per second.

**Table B-10 GLA05 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA05_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: 1						
6.0 : Last Modified : Thu Jan 27 15:34:56 GMT-0500 (EST) 2011						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_transtime	12	i2b	2	microseconds	No	gi_invalid_i2b
i_spare1	14	i1b (2)	2	NA	No	No
i_deltagpstmcor	16	i4b	4	nanoseconds	No	gi_invalid_i4b
i_dShotTime	20	i4b (39)	156	microseconds	No	No
i_lat	176	i4b (40)	160	Microdegrees	No	gi_invalid_i4b
i_lon	336	i4b (40)	160	Microdegrees	No	gi_invalid_i4b
i_elev	496	i4b (40)	160	mm	No	gi_invalid_i4b
i_spare43	656	"i4b (12, 40)"	1920	NA	No	NA
i_sigmaatt	2576	i2b (40)	80	Unitless	No	gi_invalid_i2b
i_gval_rcv	2656	i2b (40)	80	counts	No	gi_invalid_i2b
i_wfnoiseOb1	2736	i2b (40)	80	0.0001 volts	No	gi_invalid_i2b
i_wfnoiseOb2	2816	i2b (40)	80	0.0001 volts	No	gi_invalid_i2b
i_sDevNsOb1	2896	i2b (40)	80	0.0001 volts	No	gi_invalid_i2b
i_sDevNsOb2	2976	i2b (40)	80	0.0001 volts	No	gi_invalid_i2b
i_refRngNs	3056	i4b ( 40)	160	.01 ns	No	gi_invalid_i4b
i_thRtkRngOff1	3216	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_thRtkRngOff2	3376	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_minRngOff1	3536	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_minRngOff2	3696	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_preRngOff1	3856	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_preRngOff2	4016	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_centroid1	4176	i4b (40)	160	0.01 ns	No	gi_invalid_i4b

**Table B-10 GLA05 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_centroid2	4336	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_centroidInstr	4496	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_areaRecWF1	4656	i2b (40)	80	0.01 volts * ns	No	gi_invalid_i2b
i_areaRecWF2	4736	i2b (40)	80	0.01 volts * ns	No	gi_invalid_i2b
i_maxRecAmp	4816	i2b (40)	80	Tenth of millivolts	No	gi_invalid_i2b
i_maxSmAmp	4896	i2b (40)	80	Tenth of millivolts	No	No
i_reflctUncorr	4976	i4b (40)	160	Unitless*1E06	No	gi_invalid_i4b
i_reflctuncmxpk	5136	i4b (40)	160	unitless x1.E06	No	gi_invalid_i4b
i_tpCentX	5296	i2b (40)	80	arcsec*10	No	gi_invalid_i2b
i_tpCentY	5376	i2b (40)	80	arcsec*10	No	gi_invalid_i2b
i_nPeaks1	5456	i1b (40)	40	NA	No	No
i_nPeaks2	5496	i1b (40)	40	NA	No	No
i_parm1	5536	"i4b (19, 40)"	3040	"0.0001 volts, 6 * (0.0001 volts, 0.01 ns, 0.01 ns)"	No	gi_invalid_i4b
i_parm2	8576	"i4b (19, 40)"	3040	"0.0001 volts, 6 * (0.0001 volts, 0.01 ns, 0.01 ns)"	No	gi_invalid_i4b
i_solnSigmas1	11616	"i2b (19, 40)"	1520	"0.0001 volts, 6 * (0.0001 volts, 0.001 ns, 0.001 ns)"	No	gi_invalid_i2b
i_solnSigmas2	13136	"i2b (19, 40)"	1520	"0.0001 volts, 6 * (0.0001 volts, 0.001 ns, 0.001 ns)"	No	gi_invalid_i2b
i_wfFitSDev_1	14656	i2b (40)	80	unitless	No	gi_invalid_i2b
i_wfFitSDev_2	14736	i2b (40)	80	microvolts*10	No	gi_invalid_i2b
i_tpintensity	14816	i4b (40)	160	counts	No	gi_invalid_i4b
i_tpazimuth	14976	i2b (40)	80	deg*10	No	gi_invalid_i2b
i_tpeccentricity	15056	i2b (40)	80	e*1000	No	gi_invalid_i2b
i_tpmajoraxis	15136	i2b (40)	80	cm	No	gi_invalid_i2b
i_skew1	15216	i2b (40)	80	unitless * 100	No	gi_invalid_i2b
i_kurt1	15296	i2b (40)	80	unitless * 100	No	gi_invalid_i2b
i_skew2	15376	i2b ( 40)	80	unitless * 100	No	gi_invalid_i2b
i_kurt2	15456	i2b (40)	80	unitless * 100	No	gi_invalid_i2b

**Table B-10 GLA05 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_WFqual	15536	i4b (40)	160	NA	No	No
i_TxNrg	15696	i2b ( 40)	80	0.01 millijoules	No	gi_invalid_i2b
i_tpOrX	15776	i2b ( 40)	80	degrees*10	No	gi_invalid_i2b
i_locTr	15856	i4b (40)	160	0.01 ns	No	gi_invalid_i4b
i_parmTr	16016	"i4b (4, 40)"	640	"microvolts*100, microvolts*100, 0.01 ns, 0.01 ns"	No	gi_invalid_i4b
i_sDevFitTr	16656	i2b (40)	80	microvolts*10	No	gi_invalid_i2b
i_skewTr	16736	i4b (40)	160	NA	No	gi_invalid_i4b
i_maxTrAmp	16896	i2b (40)	80	0.1 millivolts	No	gi_invalid_i2b
i_gval_tx	16976	i2b	2	counts	No	gi_invalid_i2b
i_compRatio	16978	i2b (2)	4	unitless	No	i_APID_AvFlg
i_N_val	16982	i2b	2	gates	No	i_APID_AvFlg
i_r_val	16984	i2b	2	unitless	No	i_APID_AvFlg
i_ElvuseFlg	16986	i1b ( 5)	5	N/A	No	No
i_spare3	16991	i1b	1	NA	No	No
i_ElvFlg	16992	i1b (40)	40	N/A	No	No
i_spare49	17032	i1b (10)	10	N/A	No	No
i_timecorflg	17042	i2b	2	N/A	No	No
i_APID_AvFlg	17044	i1b (8)	8	n/a	No	No
i_AttFlg2	17052	i1b (20)	20	NA	No	No
i_spare4	17072	i1b	1	NA	No	N/A
i_FrameQF	17073	i1b	1	N/A	No	No
i_OrbFlg	17074	i1b (2)	2	NA	No	No
i_rngCorrFlg	17076	i1b (2)	2	N/A	No	No
i_spare5	17078	i1b ( 2)	2	NA	No	N/A
i_beam_coelev	17080	i4b	4	degrees*100	No	gi_invalid_i4b
i_beam_azimuth	17084	i4b	4	degrees*100	No	gi_invalid_i4b
i_AttFlg1	17088	i2b	2	N/A	No	No
i_RMSpulseWidth	17090	i2b ( 40)	80	100 ns	No	gi_invalid_i2b

**Table B-10 GLA05 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
i_satNdx	17170	i1b (40)	40	ns	No	gi_invalid_i1b
i_RecNrgAll	17210	i2b ( 40)	80	0.01 fJoules	No	i_APID_AvFlg
i_numItrs	17290	i1b (40)	40	N/A	NA	No
i_spare6	17330	i1b (70)	70	NA	No	N/A
Total Bytes 17400						

**B.1.12 GLA06 - Elevation**

Records are fixed length and format and occur once per second.

**Table B-11 GLA06 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA06_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: 1						
6.0 : Last Modified : Mon Mar 21 13:48:30 GMT-0400 (EDT) 2011						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_transtime	12	i2b	2	microseconds	No	gi_invalid_i2b
i_Spare1	14	i1b (2)	2	N/A	No	N/A
i_deltagpstmcor	16	i4b	4	nanoseconds	No	gi_invalid_i4b
i_dShotTime	20	i4b (39)	156	microseconds	No	No
i_lat	176	i4b (40)	160	microdeg	No	gi_invalid_i4b
i_lon	336	i4b (40)	160	microdeg	No	gi_invalid_i4b
i_elev	496	i4b (40)	160	mm	No	gi_invalid_i4b
i_campaign	656	i1b (2)	2	n/a	No	n/a
i_spare40	658	i2b	2	n/a	No	n/a
i_cycTrk	660	i4b	4	n/a	No	n/a
i_localSolarTime	664	i4b	4	seconds*1000	No	gi_invalid_i4b
i_spare41	668	i4b (7)	28	n/a	No	n/a
i_deltaEllip	696	i2b (40)	80	mm	No	n/a
i_beamCoelv	776	i4b (40)	160	degrees*100	No	gi_invalid_i4b
i_beamAzimuth	936	i4b (40)	160	degrees*100	No	gi_invalid_i4b
i_d2refTrk	1096	i4b (40)	160	m*1000	No	gi_invalid_i4b
i_SigBegOff	1256	i4b (40)	160	mm	No	gi_invalid_i4b
i_DEM_hires_src	1416	i1b (40)	40	NA	No	No
i_DEMhiresArElv	1456	"i2b (9, 40)"	720	meters	No	gi_invalid_i2b
i_ElevBiasCorr	2176	i2b ( 40)	80	mm	NA	gi_invalid_i2b
i_spare42	2256	"i2b (4, 40)"	320	n/a	No	n/a

**Table B-11 GLA06 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_sigmaatt	2576	i2b (40)	80	Unitless	No	gi_invalid_i2b
i_Azimuth	2656	i4b	4	millideg	No	gi_invalid_i4b
i_SolAng	2660	i4b	4	microdeg	No	gi_invalid_i4b
i_tpintensity_avg	2664	i4b	4	counts	No	gi_invalid_i4b
i_tpazimuth_avg	2668	i2b	2	degrees*10	No	gi_invalid_i2b
i_tpeccentricity_avg	2670	i2b	2	Unitless*1000	No	gi_invalid_i2b
i_tpmajoraxis_avg	2672	i2b	2	cm	No	gi_invalid_i2b
i_poTide	2674	i2b	2	mm	No	gi_invalid_i2b
i_gdHt	2676	i2b (2)	4	cm	No	gi_invalid_i2b
i_erElv	2680	i2b (2)	4	mm	No	gi_invalid_i2b
i_spElv	2684	i2b (4)	8	mm	No	gi_invalid_i2b
i_ldElv	2692	i2b (4)	8	mm	No	gi_invalid_i2b
i_spare12	2700	i2b (2)	4	N/A	No	None
i_wTrop	2704	i2b (2)	4	mm	No	gi_invalid_i2b
i_dTrop	2708	i2b (40)	80	mm	No	gi_invalid_i2b
i_surfType	2788	i1b	1	N/A	No	No
i_spare11	2789	i1b (3)	3	n/a	No	n/a
i_DEM_elv	2792	i4b (40)	160	cm	No	gi_invalid_i4b
i_refRng	2952	i4b (40)	160	mm	No	gi_invalid_i4b
i_TrshRngOff	3112	i4b (40)	160	mm	No	gi_invalid_i4b
i_spare47	3272	i4b (40)	160	n/a	No	n/a
i_SigEndOff	3432	i4b (40)	160	mm	No	gi_invalid_i4b
i_cntRngOff	3592	i4b (40)	160	mm	No	gi_invalid_i4b
i_reflctUC	3752	i4b (40)	160	Unitless*1E06	No	gi_invalid_i4b
i_reflCor_atm	3912	i4b	4	Unitless	No	gi_invalid_i2b
i_maxSmAmp	3916	i2b (40)	80	Tenth of millivolts	No	No
i_ocElv	3996	i2b (40)	80	mm	No	gi_invalid_i2b
i_numPk	4076	i1b (40)	40	N/A	No	No
i_kurt2	4116	i2b (40)	80	unitless * 100	No	gi_invalid_i2b



**Table B-11 GLA06 Record Format (Continued)**

<b>Product Var Name</b>	<b>Offset (Bytes)</b>	<b>Product Data Type</b>	<b>Total Bytes</b>	<b>Product Units</b>	<b>Is Unsigned?</b>	<b>Invalid Value/ Flag</b>
i_skew2	4196	i2b (40)	80	unitless * 100	No	gi_invalid_i2b
i_spare4	4276	i1b (160)	160	null	No	No
i_isRngOff	4436	i4b (40)	160	mm	No	gi_invalid_i4b
i_siRngOff	4596	i4b (40)	160	mm	No	gi_invalid_i4b
i_ldRngOff	4756	i4b (40)	160	mm	No	gi_invalid_i4b
i_ocRngOff	4916	i4b (40)	160	mm	No	gi_invalid_i4b
i_nPeaks1	5076	i1b (40)	40	NA	No	No
i_ElvuseFlg	5116	i1b ( 5)	5	N/A	No	No
i_atm_avail	5121	i1b	1	NA	No	No
i_spare16	5122	i1b ( 4)	4	n/a	No	n/a
i_cld1_mswf	5126	i1b	1	NA	No	No
i_MRC_af	5127	i1b	1	NA	No	No
i_spare9	5128	i1b (40)	40	null	NA	N/A
i_ElvFlg	5168	i1b (40)	40	N/A	No	No
i_rng_UQF	5208	i2b (40)	80	N/A	No	No
i_spare49	5288	i1b (10)	10	N/A	No	No
i_timecorflg	5298	i2b	2	N/A	No	No
i_APID_AvFlg	5300	i1b (8)	8	n/a	No	No
i_AttFlg2	5308	i1b (20)	20	NA	No	No
i_spare5	5328	i1b	1	NA	No	N/A
i_FrameQF	5329	i1b	1	N/A	No	No
i_OrbFlg	5330	i1b (2)	2	NA	No	No
i_rngCorrFlg	5332	i1b (2)	2	N/A	No	No
i_CorrStatFlg	5334	i1b (2)	2	NA	No	No
i_spare15	5336	i1b ( 8)	8	n/a	No	n/a
i_AttFlg1	5344	i2b	2	N/A	No	No
i_Spare6	5346	i1b (2)	2	N/A	No	No
i_spare44	5348	i1b ( 120)	120	n/a	No	n/a
i_satNdx	5468	i1b (40)	40	ns	No	gi_invalid_i1b
i_satElevCorr	5508	i2b (40)	80	mm	No	gi_invalid_i2b
i_satCorrFlg	5588	i1b (40)	40	NA	NA	No

**Table B-11 GLA06 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_satNrgCorr	5628	i2b (40)	80	.01fJ	No	gi_invalid_i2b
i_spare13	5708	i2b (40)	80	null	No	null
i_gval_rcv	5788	i2b (40)	80	counts	No	gi_invalid_i2b
i_RecNrgAll	5868	i2b (40)	80	0.01 fJoules	No	i_APID_AvFlg
i_FRir_cldtop	5948	i2b (40)	80	deka-meters	No	gi_invalid_i2b
i_FRir_qaFlag	6028	i1b (40)	40	NA	No	No
i_atm_char_flag	6068	i2b	2	n/a	No	n/a
i_atm_char_conf	6070	i2b	2	n/a	No	n/a
i_spare48	6072	i1b (36)	36	n/a	No	n/a
i_FRir_intsig	6108	i2b (40)	80	e7/(m-sr)	No	gi_invalid_i2b
i_spare14	6188	i1b (120)	120	Unknown	No	gi_invalid_i1b
i_Surface_temp	6308	i2b	2	degrees Celsius * 100	No	gi_invalid_i2b
i_Surface_pres	6310	i2b	2	hPa * 10	No	gi_invalid_i2b
i_Surface_relh	6312	i2b	2	percentage * 100	No	gi_invalid_i2b
i_pctSAT	6314	i1b (40)	40	percent	NA	gi_invalid_i1b
i_maxRecAmp	6354	i2b (40)	80	Tenth of millivolts	No	gi_invalid_i2b
i_sDevNsOb1	6434	i2b (40)	80	0.0001 volts	No	gi_invalid_i2b
i_TxNrg	6514	i2b (40)	80	0.01 millijoules	No	gi_invalid_i2b
i_eqElv	6594	i2b 2)	4	mm	NA	gi_invalid_i2b
i_Spare7	6598	i1b (282)	282	NA	No	No
Total Bytes 6880						

**B.1.13 GLA07 - Backscatter**

Records are fixed length and format and occur once per second.

**Table B-12 GLA07 Record Format**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
Record Type:GLA07_MAIN; % of Granule: 100; Record Duration (seconds):1; Repeats: 1						
6.0 : Last Modified : Mon Mar 21 10:49:51 GMT-0400 (EDT) 2011						
i_rec_ndx	0	i4b	4	N/A	No	No
i_UTCTime	4	i4b (2)	8	"seconds, microseconds"	No	No
i_beam_coelev	12	i4b	4	degrees*100	No	gi_invalid_i4b
i_beam_azimuth	16	i4b	4	degrees*100	No	gi_invalid_i4b
i_spare0	20	i1b (16)	16	null	No	No
i_lat	36	i4b	4	microdegrees	No	gi_invalid_i4b
i_lon	40	i4b	4	microdegrees	No	gi_invalid_i4b
i_APID_AvFlg	44	i1b (8)	8	n/a	No	No
i_OrbFlg	52	i1b (2)	2	NA	No	No
i_LidarQF	54	i2b	2	NA	Yes	No
i_AttFlg1	56	i2b	2	N/A	No	No
i_surfType	58	i1b	1	N/A	No	No
i_Spare1	59	i1b	1	NA	No	N/A
i_SolAng	60	i4b	4	microdeg	No	gi_invalid_i4b
i_pad_angle	64	i4b	4	microdegrees	No	gi_invalid_i4b
i_rng_geoid	68	i4b	4	meters	No	No
i_topo_elev	72	i4b	4	meters	No	gi_invalid_i4b
i_Rng2PCProf_Cor	76	i4b	4	centimeters	No	i_APID_AvFlg
i_Rng2CDProf_Cor	80	i4b	4	meters	No	i_APID_AvFlg
i1_g_bg	84	i4b (4)	16	photons/bin * 100	No	i_APID_AvFlg
i5_g_bg	100	"i4b (4, 5)"	80	photons/bin * 100	No	i_APID_AvFlg
i40_g_bg	180	"i4b (4, 40)"	640	photons/bin * 100	No	i_APID_AvFlg
i5_ir_bg	820	"i4b (4, 5)"	80	W*1.0d17	No	i_APID_AvFlg
i40_ir_bg	900	"i4b (4, 40)"	640	W*1.0d17	No	i_APID_AvFlg

Table B-12 GLA07 Record Format (Continued)

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i5_g_TxNrg_EU	1540	i4b (5)	20	Joules * 1.0d5	No	i_APID_AvFlg
i40_g_TxNrg_EU	1560	i4b (40)	160	Joules * 1.0d5	No	i_APID_AvFlg
i5_ir_TxNrgEU	1720	i4b (5)	20	Joules * 1.0d5	No	i_APID_AvFlg
i40_ir_TxNrgEU	1740	i4b (40)	160	Joules * 1.0d5	No	i_APID_AvFlg
i_g_TxNrg_qf	1900	i1b (10)	10	n/a	Yes	No
i_ir_TxNrg_qf	1910	i1b (10)	10	n/a	Yes	No
i_atm_dem	1920	i4b	4	meters	No	gi_invalid_i4b
i_metFlg	1924	i1b	1	NA	No	No
i_ir_bin_shift	1925	i1b	1	bins	No	No
i_Spare2	1926	i1b (6)	6	NA	No	N/A
i_g_cal_cof	1932	i4b (3)	12	1d-6*(Photons/bin)(km^3/J)sr	No	No
i_ir_cal_cof	1944	i4b (2)	8	1d4*(Watts)(km^3/J)sr	No	No
i5_g_bscs	1952	"i4b (548, 5)"	10960	e11/(m-sr)	No	gi_invalid_i4b
i40_g_bscs	12912	"i4b (148, 40)"	23680	e11/(m-sr)	No	gi_invalid_i4b
i5_ir_bscs	36592	"i4b (280, 5)"	5600	e11/(m-sr)	No	gi_invalid_i4b
i40_ir_bscs	42192	"i4b (148, 40)"	23680	e11/(m-sr)	No	gi_invalid_i4b
i_g_mbscs	65872	i4b (548)	2192	e11/(m-sr)	No	No
i_ir_mbscs	68064	i4b (280)	1120	e11/(m-sr)	No	No
i1_int_ret	69184	i4b	4	e11/(m-sr)	No	gi_invalid_i4b
i40_g_sat_prof	69188	i1b (740)	740	NA	No	No
i5_g_sat_prof	69928	i1b (343)	343	NA	No	No
i_spare3	70271	i1b (5)	5	NA	No	N/A
i_532AttBS_Flag	70276	i1b (18)	18	NA	No	No
i_1064AttBS_Flag	70294	i1b (18)	18	NA	No	No
i_AttFlg3	70312	i1b	1	NA	No	No
i_DitheringEnabledFlag	70313	i1b	1	N/A	NA	i_APID_AvFlg

**Table B-12 GLA07 Record Format (Continued)**

Product Var Name	Offset (Bytes)	Product Data Type	Total Bytes	Product Units	Is Unsigned?	Invalid Value/ Flag
i_timecorflg	70314	i2b	2	N/A	No	No
i_Surface_temperature	70316	i2b	2	degrees Celsius * 100	No	gi_invalid_i2b
i_Surface_pres	70318	i2b	2	hPa * 10	No	gi_invalid_i2b
i_Surface_relh	70320	i2b	2	percentage * 100	No	gi_invalid_i2b
i_Surface_wind	70322	i2b	2	meters/second * 100	No	gi_invalid_i2b
i_Surface_wdir	70324	i2b	2	degrees * 10	No	gi_invalid_i2b
i_spare4	70326	i1b (130)	130	NA	No	N/A
Total Bytes 70456						



## Appendix C

# Ancillary Data Product Formats

### C.1 Ancillary Data Product Descriptions

Table C.1 contains a list of all ancillary data products and a reference to where the file formats for each are described.

**Table C-1 Ancillary Data Products**

<b>ANC Product</b>	<b>Format Location</b>
ANC01-0;Header Meteorological File	See Section C.2.
ANC01-1;Height Meteorological File	See Section C.2.
ANC01-2;Temperature Meteorological File	See Section C.2.
ANC01-3;Relative Humidity Meteorological File	See Section C.2.
ANC01-4;Precipitable Water Meteorological File	See Section C.2.
ANC01-5;Windspeed U Meteorological File	See Section C.2.
ANC01-6;Windspeed V Meteorological File	See Section C.2.
ANC01-7;PBL Height Meteorological File	See Section C.2.
ANC01-8;Specific Humidity Meteorological File	See Section C.2.
ANC01-9;Above Ground Temp Meteorological File	See Section C.2.
ANC01-10;Total Cloud Cover Meteorological File	See Section C.2.
ANC04;ICRF to ITRF Transformation Interpolation File	ISF_CSR ICD
ANC07-0;Constants-Error	See GSAS User's Guide, Appendix B.
ANC07-1;Constants-Global	See GSAS User's Guide, Appendix B.
ANC07-2;Constants-Atm	See GSAS User's Guide, Appendix B.
ANC07-3;Constants-Elevation	See GSAS User's Guide, Appendix B.
ANC07-4;Constants-Waveforms	See GSAS User's Guide, Appendix B.
ANC07-5;Constants-L1A	See GSAS User's Guide, Appendix B.
ANC07-6;Constants-Product Verify	See GSAS User's Guide, Appendix B.
ANC08;Precision Orbit	ISF_CSR ICD
ANC09;Precision Attitude	ISF_CSR ICD
ANC12-0;Digital Elevation Model - Fine	See Section C.2.
ANC12-1;Digital Elevation Model - Coarse	See Section C.2.
ANC13;Geoid	See Section C.2.

**Table C-1 Ancillary Data Products**

ANC16;Load Tide Coefficients	SPOTL (Duncan Agnew -- SCRIPPS) see Section C.2.
ANC17;Ocean Tide Coefficients	GOT99.2 (Richard Ray -- GSFC) see Section C.2.
ANC18;Standard Atmosphere	There are 5 files total by season and latitude region. See Section C.2.
ANC20;Predicted Orbit	ISF_CSR ICD
ANC22-1 (8 day);Reference Orbit Ascending Nodes - 8 day	See Section C.2.
ANC22-2 (91 day);Reference Orbit Ascending Nodes - 91 day	See Section C.2.
ANC22-3 (183 day);Reference Orbit Ascending Nodes - 183 day	See Section C.2.
ANC25;GPS-UTC Conversion	ISF_CSR ICD
ANC27-0;Regional Mask - Fine	Reference 'Surface Type Grid Creation Utility User's Guide', SurfaceGridCreation_UG_v2.1.doc.
ANC27-1;Regional Mask - Coarse	Reference 'Surface Type Grid Creation Utility User's Guide', SurfaceGridCreation_UG_v2.1.doc.
ANC30;Global Aerosol Categorization Map	See Section C.2.
ANC31;Aerosol Tropospheric Classification Map	See Section C.2.
ANC33;GLAS ISF/GLAS ISIPS Interface File	ISF/ISIPS Interface Control Document
ANC35;Ozone File	See Section C.2.
ANC38;Multiple-Scattering Table	See Section C.2.
ANC41;JPL Planetary Ephemeris	See Section C.2.
ANC45 (- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15);Product Metadata Template	The format is plain ASCII text of 'keyword = value'. Also see: Section C.2.
ANC46 (-4, 8, 9, 20, 22, 25, 26, 33, 37, 39, 51, 52);Ancillary Metadata Template	The format is plain ASCII text of 'keyword = value'. Also see: Section C.2.
ANC51;SRTM DEM Data (too many files - one for each track in the 8 day and 91 day orbits)	<u><a href="#">0001245-SRTM_DEM_UG.doc</a></u> also see <u><a href="#">Section C.2.</a></u>
ANC52-1;Range Saturation Correction Table	See Section C.2.
ANC52-2;Energy Saturation Correction Table	See Section C.2.
ANC53 (54 files valid for Laser 2A);Time-based Aerosol Topospheric Map	See Section C.2.
ANC54-1;GLAS Derived DEM-Greenland Index	See Section C.2.
ANC54-2;GLAS Derived 1k DEM over Greenland	See Section C.2.
ANC54-3;GLAS Derived DEM-Antarctica Index	See Section C.2.



**Table C-1 Ancillary Data Products**

ANC54-4;GLAS Derived 500m DEM over Greenland	See Section C.2.
ANC54-5;Canadian DEM Index File	See Section C.2.
ANC54-6;Canadian DEM Elevation File for (231-299 degrees east, 70-82 degree north)	See Section C.2.
ANC55;Mean Sea Surface	See Section C.2.
ANC56;Pole Tide	See Section C.2.
ANC57;Global Bathymetry	See Section C.2.
ANC58;Ground Track (too many files - one for each track in the 8 day and 91 day orbits)	See Section C.2.
ANC59;Pointing Mode Table	See Section C.2.

## C.2 Ancillary Data Record Formats

GLAS Ancillary Files are described on the GLAS product description website.

### ANC01 Subsetted Meteorological File

The ANC01 files are subsets of the NCEP gridded meteorological data. There are eleven ANC01 files that are derived from the NCEP data file. The filenames and description are listed below:

ANC01.....00.DAT        header   file (ASCII).

Each line contains the record number, record location (in the GRIB file), date, pressure level, and variable (height, temperature, relative humidity, etc). The GSAS software only uses the last two elements (i.e. pressure and variable).

The remaining files are fortran binary files with no header. Each record in the file contains an array of 360x181 4 byte values which correspond to a 1 degree by 1 degree global grid starting at 90 degrees lat and 0 degrees lon. Therefore each record is 260640 bytes, and each file will contain as many records as the number of pressure levels indicated in the header file listed above (i.e each record corresponds to a pressure level).

ANC01.....01.DAT	gridded heights (binary)
ANC01.....02.DAT	gridded temperature (binary)
ANC01.....03.DAT	gridded relative humidity
ANC01.....04.DAT	gridded precipitable water
ANC01.....05.DAT	gridded surface wind speed u
ANC01.....06.DAT	gridded surface wind speed v
ANC01.....07.DAT	gridded planetary boundary height
ANC01.....08.DAT	gridded specific humidity
ANC01.....09.DAT	gridded above ground temp
ANC01.....10.DAT	gridded total cloud cover

## ANC12 Digital Elevation Model

The Digital Elevation Model (DEM) provides the surface height above the mean ellipsoid.

From GTOPO30 (U.S. Geological Survey's EROS Data Center).

There are two anc12 files. anc1200 is the DEM File, and anc1201 is the Mask File

The mask file (anc1201) is a 1 degree by 1 degree land mask and contains either a zero (meaning no land), or the record number of a block of data in anc1200.

```
integer (kind=i2b), dimension(180,360), public :: i_LandMsk = 0
do i_cntr= 1, 180 ! latitude
  read(i_Lun,rec=i_cntr,iostat=i_ioErr) i_LandMsk(i_cntr,1:360)
enddo
```

To use the land mask to find the elevation of 87.8 deg latitude, 210.79 deg longitude, use the following to calculate the indices for the mask:

```
i_LonOffset=int(d_lon) + 1      ! lon offset in the Land mask
i_latOffset = nint(90.5d0 - int(d_lat) - sign(0.5d0,d_lat)) ! lat offset
i_DEMrecnum = i_LandMsk(i_LatOffset,i_LonOffset) ! for the example, i_DEMrecnum =
i_LandMsk(3,211)
```

```
integer (kind=i2b), dimension(122,122), save :: i_DEMval
read(i_DEMfileID, rec=i_DEMrecnum,iostat=i_ioErr) i_DEMval
```

```
gd_DEMdLat = 0.0083333333333333d0
gd_DEMdLon= 0.0083333333333333d0
! First get start lat, lon of the 1 deg DEM block
d_LatDEMst = 90.004166666666667d0 - (i_latOffset-1.0d0)
d_LonDEMst = (i_lonOffset - 1.0d0) + -0.004166666666667d0
d_diffLat = ((d_LatDEMst - d_lat)/gd_DEMdLat) + 1.000000001d0
i_lat1 = int(d_diffLat)
i_lat2 = i_lat1 + 1
d_LatRatio = d_diffLat - DBLE(int(d_diffLat))
d_diffLon = ((d_lon - d_lonDEMst)/gd_DEMdLon) + 1.000000001d0
i_lon1 = int(d_diffLon)
i_lon2 = i_lon1 + 1
d_LonRatio = d_diffLon - dble(int(d_diffLon))
```

Get DEMrecnum from LandMask for each of four points (lat1,lon1), (lat1,lon2), (lat2,lon1) and (lat2,lon2),

Get DEMval for each DEMrecnum

The elevation should be interpolated from the following four points:

```
d_ht(1) = dble(i_DEMval(i_lat1,i_lon1))
d_ht(2) = dble(i_DEMval(i_lat1,i_lon2))
d_ht(3) = dble(i_DEMval(i_lat2,i_lon1))
d_ht(4) = dble(i_DEMval(i_lat2,i_lon2))
```

### **ANC13 Geoid**

The anc13 file is the EGM2008 geoid referenced to the TOPEX/Poseidon ellipsoid, with mean tides applied.

The format of the file is as follows:

Unformatted, Direct access, fixed record length=12 bytes  
 Record 1 contains: Nlat, Nlon, MinLat;  
 Record 2 contains: MinLon, MaxLat, MaxLon;  
 Records 3-7 are blank header records;  
 Records 8-EOF contains: Lat, Lon, Ght;?Parameter Descriptions:  
 Nlat = I\*4 number of latitude rows in grid;  
 Nlon = I\*4 number of longitude columns in grid;  
 MinLat = I\*4 Minimum latitude of grid in deg X 10<sup>6</sup>;  
 MinLon = I\*4 Minimum longitude of grid in deg X 10<sup>6</sup>;  
 MaxLat = I\*4 Maximum latitude of grid in deg X 10<sup>6</sup>;  
 MaxLon = I\*4 Maximum longitude of grid in deg X 10<sup>6</sup>;  
 Lat = I\*4 Latitude in deg X 10<sup>6</sup>;  
 Lon = I\*4 Longitude in deg X 10<sup>6</sup>;  
 Ght = I\*4 Geoid Height in meters \* 10<sup>5</sup>;

ANC13\_mmm\_nn\_ff.dat

### **ANC16 Load Tide Coefficients**

This file provides the load tide model the coefficients for corrections to the surface elevation for based on the load tide.

Reference -SPOTL (Duncan Agnew -- SCRIPPS)

```
Real (kind=R4b) :: r_record(5760)

type load_tide_type
  real (kind=R4b), dimension(8) :: r_ampl
  real (kind=R4b), dimension(8) :: r_phase
end type load_tide_type
```

```

type (load_tide_type) :: loadHarmonics(360)  ! For 360 lon points
type (load_tide_type) :: gridhar(4)  ! Harmonics at 4 grid points

```

```

! Read load tide coeffs file to get grid parameters
read(unit=i_LdTdFile,rec=1,iostat=i_ioErr) r_record
r_latMax=r_record(1)
r_lonMin=r_record(2)
r_latMin=r_record(3)
r_lonMax=r_record(4)
r_deltaLat=r_record(5)
r_deltaLon=r_record(6)

```

! Get the values at the 4 locations around the spot. Each value has 8 amplitude and phase coefficients

```

! For Lat1
read(unit=i_LdTdFile,rec=i_lat1+1,iostat=i_ioErr) loadHarmonics
gridhar(1) = loadHarmonics(i_lon1)
gridhar(2) = loadHarmonics(i_lon2)
! Get the load harmonics of the two points at Lat2
read(unit=i_LdTdFile,rec=i_lat2+1,iostat=i_ioErr) loadHarmonics
gridhar(3) = loadHarmonics(i_lon1)
gridhar(4) = loadHarmonics(i_lon2)

```

## ANC17 Ocean Tide Coefficients

This file provides the model for corrections to the surface elevation based on the ocean tide. GOT99.2 (Richard Ray -- GSFC)

This file is ascii.

```

READ(LU,1) TITLE(1:80)
READ(LU,1) TITLE(81:160)
1 FORMAT(A80)

READ(LU,2) NY,NX
2 FORMAT(16X,I5,16X,I5)
READ(LU,3) LATMIN,LATMAX
READ(LU,3) LONMIN,LONMAX
3 FORMAT(16X,F9.0,16X,F9.0)
READ(LU,3) UNDEF
READ(LU,1) FORMATx
DO J=1,NY

```

```

      READ(LU,FORMATx) (G(I,J),I=1,NX)
    ENDDO

```

### ANC18 Standard Atmosphere

The ANC18 Standard Atmosphere is an ASCII file of temperature and pressure as a function of height. The file is divided in 5 sections by season and latitude region: 1) Tropical, 2) mid-latitude summer, 3) mid-latitude winter, 4) Arctic winter and 5) Arctic Summer. This file is used by the atm\_anc and atmosphere processing only if the ANC01 files are missing. The ANC18 file includes a header which describes the data in the file.

### ANC22 Reference Orbit Ascending Nodes

The subroutine read\_line, uses the following to read the file and ignores blank lines or those starting with "#" read(InUnit,fmt="(A255)",iostat=IOStatus) line

```

real*4      :: lon
integer*4   :: track
real*8      :: reltime
integer*4   :: mjd
real*8      :: sec
real*4      :: period
integer*4   :: num_anc22
character (len=255) :: inline

call read_line(Unit,inline,ios)
read(inline,*) period, num_anc22
gi_num_anc22 = num_anc22

do i = 1, gi_num_anc22
  call read_line(Unit,inline,ios)
  read(inline,*,iostat=ios) lon, track, reltime, mjd, sec
enddo

```

This is a multi-file granule, 1 file for each reference orbit, 8day, 91day, 183day, giving the ascending node with associated track number and time for each revolution in the reference orbit.

ANC22\_mmm yyymmdd\_hhmmss\_nn\_ff.dat

### ANC30 Global Aerosol Categorization Map

```

Integer*4, public :: gi_aer_cat(360,181)

```

```

do j=1,181
  read(unit,*)(gi_aer_cat(i,j),i=1,360)
enddo

```

This file contains global aerosol characterization map for the planetary boundary layer, (PBL). This is a number from 0 to 15 indicating the type of aerosol most likely to be found at a given lat/lon for the PBL.

### **ANC31 Aerosol Tropospheric Classification Map**

```

Integer*4, public :: gi_trop_cat(360,181)
do j=1,181
  read(unit,*)(gi_trop_cat(i,j),i=1,360)
enddo

```

This file contains global aerosol characterization map for elevated tropospheric aerosols. This is a number from 0 to 15 indicating the type of aerosol most likely to be found at a given lat/lon for elevated aerosol layers.

### **ANC35 Ozone File**

Ozone concentration as a function of season and latitude. This is used in the calculation of calibrated backscatter.

```

type, public :: ozone_type
  Real*8, dimension(795) :: d_hgt !Height in km (AMSL)
  !Ozone mass mixing ratio in kg/kg by height and month
  Real*8, dimension(795, 12) :: d_mass_mix_rat
end type ozone_type
type (ozone_type), public :: ozone(18)
Character*80 ch_dum
Character*40 vers_anc35_ozone
read(unit,*,iostat=ios) vers_anc35_ozone
do i=1,18
  read(unit,'(a80)') ch_dum
  read(unit,'(a80)') ch_dum
  do j=1,795
    read(unit,*,iostat=ios) ozone(i)%d_hgt(j), ozone(i)%d_mass_mix_rat(j,:)
  enddo
enddo

```

## ANC38 Multiple-Scattering Table

The files contain File 1) the multiple scattering correction factor for clouds and aerosols ( $\eta$ ) as a function of optical depth, particle size, layer depth and height for 1064 nm, File 2) the multiple scattering correction factor for clouds and aerosols ( $\eta$ ) as a function of optical depth, particle size, layer depth and height for 532 nm 2) the cloud particle size as a function of latitude, longitude, temperature and height and File 3) the range delay values as function of optical depth, particle size, layer depth and height and File 4) the cloud particle size as a function of latitude, longitude, temperature and height.

There are four Anc38 data files:

### Anc3801 (the $\eta$ 1064 data structure)

```

CHARACTER*80 ch_dum
REAL*4 r_eta_1064(7, 7, 8, 10)
READ(unit,fmt="(A80)") ch_dum
READ(unit_in,fmt="(A80)") ch_dum
DO i=1,8
  READ(unit_in,fmt="(A80)") ch_dum
  READ(unit_in,fmt="(A80)") ch_dum
  do j=1,7
    read(unit, fmt="(23x, f7.0, 6f12.0)",iostat=ios) (r_eta_1064(j,k,i,1),k=1,7)
  enddo
enddo

```

### Anc3802 (the $\eta$ 532 data structure)

```

CHARACTER*80 ch_dum
Real*4 r_eta_532 (7,7,10)
READ(unit_in,fmt="(A80)") ch_dum
READ(unit_in,fmt="(A80)") ch_dum
READ(unit_in,fmt="(A80)") ch_dum
DO i=1,7
  Read(unit_in,fmt="(23x,f7.0,6f12.0)",iostat=ios) (r_eta_532(i,j,1),j=1,7)
ENDDO

```

### Anc3803 (the rng data structure)

```

CHARACTER*80 ch_dum
Real*4 r_rng(7,7,8,10)
DO i=1,7
  READ(unit_in,fmt="(A80)") ch_dum
  READ(unit_in,fmt="(A80)") ch_dum
  READ(unit_in,fmt="(A80)") ch_dum

```

```

READ(unit_in,fmt="(A80)") ch_dum
DO j=1,8
  Read(unit_in,fmt="(15x,7f12.0)",iostat=ios) (r_rng(i,k,j,1),k=1,7)
ENDDO
ENDDO

```

**Anc3804** (the rad data structure)

```

CHARACTER*80 ch_dum
Real*4 r_rad(18,18,12,3)
READ(unit_in,fmt="(A80)") ch_dum
DO i=1,3
  DO j=1,12
    READ(unit_in,fmt="(A80)") ch_dum
    DO k=1,18
      Read(unit_in,fmt="(18f3.0)",iostat=ios) (r_rad(l,k,j,i),l=1,18)
    ENDDO
  ENDDO
ENDDO

```

**ANC41 JPL Planetary Ephemeris**

JPL Planetary Ephemeris for the years 2000-2040. This is used to solve for the transformation matrix and sun position calculation.

The file is direct access and is read in the following way:

```

CHARACTER*80 fileName
CHARACTER*6 TTL(14,3), CNAM(400)
Integer iRecSz, nRecL, iPt(3,13), numDe, nCon
Real*8 EMRAT, AU, SS(3), CVAL(400)
COMMON/EPHHDR/ CVAL, SS, AU, EMRAT, numDe, nCon, iPt
COMMON/CHRHDR/ CNAM, TTL

```

```

INQUIRE(FILE= fileName,RECL= iRecSz)
OPEN(unit, FILE=fileName, ACCESS='DIRECT', FORM='UNFORMATTED', RECL=
iRecSz, STATUS='OLD')
READ(unit,REC=1) TTL, CNAM, SS, NCON, AU, EMRAT, ((iPt(I,J),I=1,3),J=1,12),
numDe, (iPt(I,13),I=1,3)

```

**ANC45 Product Metadata Template**

These are the product metadata template files created from the GLAS product ESDTs.

They are used to create GLAxx\_.met files. This is a multi-file granule where each granule is numbered according to the source GLA file. For example, the metadata template for GLA01 is ANC45\*\_01.dat, for GLA02, ANC45\*\_02.dat, etc. The format is plain ASCII text of



'keyword = value'.

## ANC46 Ancillary Metadata Template

These are the ancillary metadata template files created from the GLAS Ancillary ESDTs. They are used to create ANCxx\_.met files. This is a multi-file granule where each granule is numbered according to the source ANC file. For example, the metadata template for ANC04 is ANC46\*\_04.dat, for ANC08, ANC45\*\_08.dat, etc. The format is plain ASCII text of 'keyword = value'.

## ANC51 SRTM DEM Data

The Shuttle Radar Topography Mission (SRTM) was flown to map the world in three dimensions. One of the data products of this mission is a digital topographic map of the Earth's land surface with points spaced 3 arc-seconds apart, roughly a resolution of 90 meters in latitude and in longitude.

This data product provides a high-resolution digital elevation map (DEM) of much of the Earth's surface. **The Maker program** utilizes this database to generate a pre-sorted and ICESat-friendly formatted set of files that can be used to supply GLAS software and related utilities with DEM data.

The Maker program can be found in the GLAS GSAS DAP.

Each record in an ANC51 file is 16bytes. ANC51 files have four header types. The first header contains:

TYPE, private :: Header1

Sequence

```
INTEGER(kind=i2b) :: i_data_interval    ! number of data intervals
INTEGER(kind=i2b) :: i_track_number     ! track number
INTEGER(kind=i4b) :: i_origin_date      ! origination date, DDMMYYYY
INTEGER(kind=i2b) :: i_start_time       ! track start time
INTEGER(kind=i2b) :: i_stop_time        ! track stop time
REAL (kind=r4b)   :: r_equator_cross    ! equator crossing longitude
```

END TYPE Header1

And is read by:

```
READ(UNIT=Unitnum,REC=1,IOSTAT=ios1) Header_One
```

The second header contains:

TYPE, private :: Header2

sequence

```
INTEGER(kind=i4b) :: i_time_init    ! start time from start of file
INTEGER(kind=i4b) :: i_rec_init     ! record number of initial rec.
```

```

    INTEGER(kind=i4b) :: i_rec_fini    ! record number of final rec.
    INTEGER(kind=i4b) :: i_rec_skip    ! number skipped record nums in fini
    INTEGER(kind=i4b) :: i_time_fini   ! end time from start of file
END TYPE Header2
TYPE(Header2), private, allocatable :: Header_Two(:)

```

And is read by:

```

    INTEGER (kind=i4b) :: TRK4(4)      ! Array for reading records
    IF (ALLOCATED(Header_Two)) DEALLOCATE(Header_Two)
    ALLOCATE(Header_Two(N_Intervals))
    DO i=1,N_Intervals
        READ(UNIT=Unitnum,REC=1+i,IOSTAT=ios1) TRK4
        Header_Two(i)%i_time_init = TRK4(1)
        Header_Two(i)%i_rec_init  = TRK4(2)
        Header_Two(i)%i_rec_fini  = TRK4(3)
        Header_Two(i)%i_rec_skip  = TRK4(4)
        Header_Two(i)%i_time_fini = TRK4(1) - TRK4(4) + 4*(TRK4(3)-TRK4(2)+1)
    ENDDO

```

```

    Time_Dif = Local_Time - Header_Two(i)%i_time_init
    Rec_Num  = Header_Two(i)%i_rec_init + Time_Dif / 4

```

The third header contains:

```

    INTEGER (kind=i4b) :: Header_Three(4)

```

And is read by

```

    READ(UNIT=Unitnum,REC=Rec_Num,IOSTAT=ios1) Header_Three

```

Where

```

    N_SecRec = Header_Three( MOD(Time_Dif,4)+1 )

```

And the fourth header contains:

```

TYPE, private :: Header4
sequence
    CHARACTER (len=7) :: c_cell_name    ! cell name at segment start
    INTEGER(kind=i1b) :: i_spares(4)    ! spares
    INTEGER(kind=i1b) :: i_count_valid   ! count of valid entries
    INTEGER(kind=i1b) :: i_flag_data     ! flag storage byte
    INTEGER(kind=i1b) :: i_lat_degrees   ! degrees of latitude
    INTEGER(kind=i2b) :: i_lat_offset_index ! latitude offset index
END TYPE Header4

```

Then the DEM elevation data are read by a series of reads indexing into the file.

First data read by:

```

INTEGER (kind=i1b) :: TRK1(16)

DO k=0,4

  READ(UNIT=Unitnum,REC=N_SecRec+k,IOSTAT=ios1) TRK1

  Seg_Head(1+k*16:16+k*16) = TRK1

ENDDO

READ(UNIT=Unitnum,REC=N_SecRec+5,IOSTAT=ios1) Header_Four_Loc

IF (Rising) THEN

  increment = NINT((Lat - seg_master_lat) / cell_inc)

ELSE

  increment = NINT((seg_master_lat - Lat) / cell_inc)

ENDIF

DO k=1,increment

  Rec_2_Read = Rec_2_Read + Seg_Head(k)

ENDDO

```

The first data record has the following format:

TYPE, private :: Swath\_Begin

sequence

```

INTEGER(kind=i1b) :: i_left_locat_flg  ! left edge locator flags

INTEGER(kind=i1b) :: i_left_lat        ! left edge lat [deg]

INTEGER(kind=i1b) :: i_left_lon        ! left edge lon-90 [deg]

INTEGER(kind=i1b) :: i_num_elev_pts    ! number of elevation pts

```

---

```
INTEGER(kind=i2b) :: i_lat_offset_index ! latitude offset index
```

```
INTEGER(kind=i2b) :: i_lon_offset_index ! longitude offset index
```

```
INTEGER(kind=i2b) :: i_elevations(4) ! first four elevations
```

```
END TYPE Swath_Begin
```

And is read by:

```
N_Swath = N_SecRec + 6 + Rec_2_Read
```

```
READ(UNIT=Unitnum,REC=N_Swath,IOSTAT=ios1) Sw_First_Rec
```

```
Num_Elev = Sw_First_Rec%i_num_elev_pts
```

```
Num_Cen = (Sw_First_Rec%i_num_elev_pts)/2 + 1
```

```
IF (BTEST(Sw_First_Rec%i_left_locat_flg,0)) THEN
```

```
    Lat_Cen = -(DFLOAT(Sw_First_Rec%i_left_lat) -           &
                DFLOAT(Sw_First_Rec%i_lat_offset_index)/1200.0D0)
```

```
ELSE
```

```
    Lat_Cen =  DFLOAT(Sw_First_Rec%i_left_lat) +           &
                DFLOAT(Sw_First_Rec%i_lat_offset_index)/1200.0D0
```

```
ENDIF
```

```
True_Lon = int((Sw_First_Rec%i_left_lon + 90),i2b)
```

```
IF (BTEST(Sw_First_Rec%i_left_locat_flg,1)) THEN
```

```
    Lon_Cen = -DFLOAT(True_Lon) +                           &
                DFLOAT(Sw_First_Rec%i_lon_offset_index)/1200.0D0
```

```
    Lon_Cen = Lon_Cen + 360.0d0
```

```
ELSE
```

```
    Lon_Cen =  DFLOAT(True_Lon) +                           &
                DFLOAT(Sw_First_Rec%i_lon_offset_index)/1200.0D0
```

```
ENDIF
```

After the first data record in a swath, the data are read as follows:

```

INTEGER*2 TRK2(8)

cell_inc = 1.0d0 / 1200.0d0

Lon_Offset = NINT((Lon - Lon_Cen) / cell_inc)

Lon_Index = Num_Cen + Lon_Offset

Elv_Record = (Lon_Index - 5)/8 + 1

READ(UNIT=Unitnum,REC=(N_Swath+Elv_Record),IOSTAT=ios1) TRK2

Elv_Index = (Lon_Index-4) - 8 * (Elv_Record-1)

Elv = TRK2(Elv_Index)

```

### **ANC52-01 Range Saturation Correction Table**

When the waveform is saturated there is an error induced in the range estimate. Lab testing has produced measured values for gain above 13 and an estimated correction for gain less than or equal to 13. This file contains the range correction in millimeters. The table has two sets of entries (1001,256) to allow for different operation periods. The header records contain the index to start of table for up to 12 configurations and the start and stop UTC times for these periods. Only 4 for periods are actually used.

-read anc5201 and put the data in gd\_rngCorrTbl(1001,256)

-file format is:

header:

```

RECL=1024;
NUMHEAD=1;
VERSION 1.0, mm/dd/yyyy*;
NUMRECS=1001;
GRAN_E =0.1000D-15;
MIN_E =0.0000D+00;
MAX_E =0.1000D-12;
SCALE =0.1000D-03;
DETECT = 1;
SOURCE = 2;
NTAB =12;
TREC01 = 2;
TREC02 =1003;
TREC03 =2004;
TREC04 =1003;
TREC05 =1003;

```

```

TREC06 =1003;
TREC07 =1003;
TREC08 =1003;
TREC09 =1003;
TREC10 =1003;
TREC11 =1003;
TREC12 =1003;
TBEG01 = 99049000;
TEND01 = 102230000;
TBEG02 = 117781000;
TEND02 = 141110000;
TBEG03 = 150110000;
TEND03 = 277660000;
TBEG04 = 280906000;
TEND04 =1073741800;
TBEG05 =1073741800;
TEND05 =1073741800;
TBEG06 =1073741800;
TEND06 =1073741800;
TBEG07 =1073741800;
TEND07 =1073741800;
TBEG08 =1073741800;
TEND08 =1073741800;
TBEG09 =1073741800;
TEND09 =1073741800;
TBEG10 =1073741800;
TEND10 =1073741800;
TBEG11 =1073741800;
TEND11 =1073741800;
TBEG12 =1073741800;
TEND12 =1073741800;DETECT = 1;

```

data:

the range correction data follows in binary i4b with each record having the 256 gain values.  
Each record is for one energy step.data:

```

i_rngCorrTbl(1,1),i_rngCorrTbl(1,2),...,i_rngCorrTbl(1,256)
i_rngCorrTbl(2,1),i_rngCorrTbl(2,2),...,i_rngCorrTbl(j,k)

```

The table values are scaled to meters

$$gd\_rngCorrTbl(j,k) = i\_rngCorrTbl(j,k) * SCALE$$

$j = \text{INT}(\text{recNrg}/gd\_grnErng) + 1$  (recNrg & gd\_grnErng are in fJ)

( gd\_grnErng = GRAN\_E )

$k = \text{irecGain} + 1$  (irecGain is in counts)?

Estimations are provided for gains and energy not measured in lab.

For gain  $\leq 13$ :

For recNrg  $< 9.0$  fJ, gd\_rngCorrTbl = 0.0d0

For  $9.0\text{fJ} \leq \text{recNrg} \leq 16.0\text{fJ}$

$\text{gd\_rngCorrTbl} = (0.68706\text{d}0 - 0.30919\text{d}0 * \text{recNrg}$   
 $+ 0.049006\text{d}0 * \text{recNrg}^2 - 0.0032897\text{d}0 * \text{recNrg}^3$   
 $+ 0.000085389\text{d}0 * \text{recNrg}^4) * 0.5\text{d}-9 * \text{gd\_C}$

For recNrg  $> 16.0\text{fJ}$

$\text{gd\_rngCorrTbl} = (-1.9426\text{d}0 + 0.14868\text{d}0 * \text{recNrg}) * 0.5\text{d}-9 * \text{gd\_C}$

For gain  $> 13$ : all gi\_invalid\_i4b in file and gd\_invalid\_r8b in gd\_rngCorrTbl

gd\_rngCorrTbl is in meters

### ANC52-02 Energy Saturation Correction Table

When the waveform is saturated there is an error induced in the energy estimate. This file will contain the energy correction when it has been determined.

-read anc5202 and put the data in gd\_rngCorrTbl(101,256)

-file format is:

header:

RECL=1024;

NUMHEAD=1;

VERSION 1.0, 06/15/2005\*;

NUMRECS= 101;

GRAN\_E =0.1000D-14;

MIN\_E =0.0000D+00;

MAX\_E =0.1000D-12;

SCALE =0.1000D-03;

DETECT = 1;

SOURCE = 0;

data:

the energy correction data follows in binary i4b with each record having the 256 gain values.  
 Each record is for one energy step

$i\_nrgCorrTbl(1,1), i\_nrgCorrTbl(1,2), \dots, i\_nrgCorrTbl(1,256)$

$i\_nrgCorrTbl(2,1), i\_nrgCorrTbl(2,2), \dots$

$\dots, i\_nrgCorrTbl(j,k)$

$\text{gd\_rngCorrTbl}(j,k) = i\_nrgCorrTbl(j,k) * \text{SCALE}$

$j = \text{INT}(\text{recNrg}/\text{gd\_grnEnrg}) + 1$  (recNrg & gd\_grnEnrg are in fJ)

( gd\_grnEnrg = GRAN\_E )

$k = \text{irecGain} + 1$  (irecGain is in counts)

For gain > 13: all gi\_invalid\_i4b in file and gd\_invalid\_r8b in gd\_nrgCorrTbl

### **ANC53 Time-based Aerosol Tropospheric Map**

Time-based aerosol tropospheric map

This file contains a time-based global aerosol characterization map for elevated tropospheric aerosols. One file is provided for each day at 1 x 1 degree. This is a number from 0 to 15 indicating the type of aerosol most likely to be found at a given lat/lon for elevated aerosol layers.

The file is fixed format and can be read with the following fortran statement:

```
read(unit,*,iostat=ios) utc_time, lat, lon, si1, si2
```

where

```
real*8 :: utc_time, lat, lon, si2, si1
```

### **ANC54-01 GLAS Derived DEM-Greenland Index**

Made for mantis 0002754 using refmt\_icesat\_dem.f

anc54\_001\_01\_0001.dat and anc54\_001\_01\_0002.dat were made from

glas\_grn\_1km\_L1\_L3ABC\_elev\_mm\_2782x2611.hdr and

glas\_grn\_1km\_L1\_L3ABC\_elev\_mm\_2782x2611.dat

The default invalid entry for data (5402 & 5404) is -1000 m. The scale of the elevations is 0.001d0

5401 - index file for Greenland

record length = 100

byte

1 nX = 5

2 nY = 5

3 X0 minX = 3621?4 Xn maxX = 6231

5 Y0 minY = 5140

6 Yn maxY = 7921

7 sc input scale in mm = 1000000

8-100 zero filled

101-200 gi\_a5401\_ndx(5,5)

### **ANC54-02 GLAS Derived 1k DEM over Greenland**

Made for mantis 0002754 using refmt\_icesat\_dem.f

anc54\_001\_01\_0001.dat and anc54\_001\_01\_0002.dat were made from

glas\_grn\_1km\_L1\_L3ABC\_elev\_mm\_2782x2611.hdr and

glas\_grn\_1km\_L1\_L3ABC\_elev\_mm\_2782x2611.dat



anc54\_001\_01\_0003.dat and anc54\_001\_01\_0004.dat were made from

glas\_ant\_500m\_biquad\_L123\_elev\_mm\_9368x11352.hdr and

glas\_ant\_500m\_biquad\_L123\_elev\_mm\_9368x11352.dat

The default invalid entry for data (5402 & 5404) is -1000 m. The scale of the elevations is 0.001d0

5402 - GLAS derived 1k DEM over Greenland, polar stereographic grid record length = 1648656 25

records of i4b(642,642)

### **ANC54-03GLAS Derived DEM-Antarctica Index**

GLAS derived DEMS over Antarctica Index file

using refmt\_icesat\_dem.f

anc54\_001\_01\_0001.dat and anc54\_001\_01\_0002.dat were made from

glas\_grn\_1km\_L1\_L3ABC\_elev\_mm\_2782x2611.hdr and

glas\_ant\_500m\_biquad\_L123\_elev\_mm\_9368x11352.hdr and

glas\_ant\_500m\_biquad\_L123\_elev\_mm\_9368x11352.dat

The default invalid entry for data (5402 & 5404) is -1000 m. The scale of the elevations is 0.001d0

5403 - index file for Antarctica

record length = 1080

byte

1 nX =18

2 nY =15

3 X0 minX = 3398

4 Xn maxX = 14749

5 Y0 minY = 4423

6 Yn maxY = 13790

7 sc input scale in mm = 500000

8-1080 zero filled

1081-2160 gi\_a5403\_ndx(18,15)

### **ANC54-04 GLAS Derived 500m DEM over Greenland**

GLAS derived DEMS Antarctica data file

To get an elevation, the (lat,lon) is converted to polar stereographic coordinates. Those coordinates are used to read the index file for the the record number in the data file, and to interpolate the elevation. See subroutines fetch\_ICESat\_DEM and fetch\_new\_grid in anc54\_dem\_mod in the GLAS GSAS DAP.

**ANC54-05 and ANC54-06**

ANC54-05 is the Canada DEM index file. It is direct access, big endian, recl=64800 (I\*2 iNdx(360,90)), iNdx contains the record number in anc5406, or 0 if there is no data for that degree cell.

ANC54-06 is the Canada DEM data file. It is direct access, big endian recl=25934402 (I\*2 iElv(3601,3601))meters. Note-The elevations within Canada south of 70 deg north were included in anc51.

The index file gives the record number in anc5406 for a one-degree by one-degree cell of elevations. Each cell contains 3601 x 3601 elevations.

To find the elevation of a point within Canada, say 250.25 E, 74.75 N, use the whole degrees as the index into the index file: irec = iNdx(250,74). Read the record irec from anc5406.

iLonNdx = INT((d\_lon - DBLE(ilon))\*3600.0d0) + 1

For the example 250.25 E , iLonNdx = (0.25 \* 3600) + 1 = 901

jLatNdx = INT((d\_lat - DBLE(ilat))\*3600.0d0) + 1

For the example 74.75 N , iLatNdx = (0.75 \* 3600) + 1 = 2701

So, elevation(250.25,74.75) = iElv(901,2701)

**ANC55 Mean Sea Surface**

Data derived from Danish National Space Center (DNSC08). Source is DNSC08MSS\_1min.mss.gz from <ftp.spacecenter.dk/pub/MSS>

GSAS routine mk\_anc55.f was used to create eth file. See GLAS GSAS DAP.

The file has a record size of 75076, and consists of a header record followed by 2.25 deg by 2.25 deg data records (i4b(137,137) one data point per 1 minute of longitude/latitude plus overlap).

header:

RECL=75076;[cr] ( 1-13) record length

VER=1.0 05/12/2009\*; (14-35) version

NLAT=80;[cr] (36-48) number of grid cells north to south

NLON=160;[cr] (49-61) number of grid cells east to west

SCALE=0.001;[cr] (62-74) scale

MXLA=89.991667;[cr] (75-92) max lat

MNLA=-89.991667;[cr] (93-110) min lat

MXLO=360.008333;[cr] (111-128) max lon

MNLO=-0.008333;[cr] (129-146) min lon

iNDX=1001;[cr] (147-159) location in rec 1 of index

zero fill (160-1000)? ndx(160,80) (1001-52200) index

zero fill (52201-75076)

The indices for ndx(ilon,ilat) are:

$ilon = \text{INT}((d\_lon(ishot) - MNLO)/2.25d0) + 1$

$ilat = \text{INT}((MXLA - d\_lat(ishot))/2.25d0) + 1$

The lon,lat of the upper left cell of each data record

(gi\_anc55\_MSS(1,1)) is:

$dlon1 = \text{DBLE}(ilon-1) * 2.25d0 + MNLO$

$dlat1 = MXLA - \text{DBLE}(ilat-1) * 2.25d0$

## ANC56 Pole Tide

This file contains the earth orientation parameters.

The data is derived from the geodyn supplied master\_bih.table

GSAS routine mk\_anc56.f was used to create eth file. See GLAS GSAS DAP.

The file is ascii, and each line consists of format(I11,I9,1X,2F8.1,d16.6):

col

1-11 j2000sec

12-20 iyynd

21 space

22-29 dX (dX & dY are used by e\_calcpoletd to compute the pole tide)

30-37 dY?38-53 dUTC (not used at this time)

for example:

286632000 20090131 -102.8 205.4 0.336522D+02

## ANC57 Global Bathymetry

The ANC57 file is a reformatted global bathymetry file from DTU Space.

The original DNS08BAT\_1min.bat ASCII file contains Bathymetry derived from satellite mapped with a resolution of 1 minute by 1 minute. \* This ANC57 file is a 1deg x 1degree gridded Bathymetry file.

The file has 180x360 records, with record 1 being lat 89/lon 0, record 2 = lat 89/lon 1, record 3 = lat 89/lon 2, record 360 = lat 89/lon 359, record 361 = lat 88/lon 0, and so on. Each record is a 62x62 real\*4, with the 62 rows and columns being the 1 min Bathymetry values within the 1x1 degree grid. There is a 1 min overlap between the grids to facilitate interpolation. The coverage area is + 90.00833334 to - 90.00833334 degrees lat and -0.00833333 to 360.00833335 degrees E longitude. The delta lat/lon is 0.01666667 degrees.

\*Andersen et al. The DNSC08 global Mean sea surface and Bathymetry. Presented EGU-2008, Vienna, Austria, April, 2008.

### ANC58 Ground Track

Each anc58 contains one orbit, written in direct access with four records - one for each segment (file size 53280 bytes, record size 13320 bytes). Each record starts approximately six seconds before the beginning of the corresponding segment (+/- 50 deg lat) and contains 1665 spots (sampled at 1hz), so each record has an overlap at its end with the following record.

The format of each record is:

```
bytes      1:6660      i*4 INT i_lat (1:1665) (d_lat * 10^6)
          6661:13320 i*4 INT I_lon (1:1665) (d_lon * 10^6)
```

(d\_lat in degrees = i\_lat/ 10^6)

(d\_lon in degrees = i\_lon/ 10^6)

The last anc58 file (anc58\_001\_01\_0119.dat (8day) & anc58\_001\_02\_4376.dat (91day)) overlaps at the end of segment four with the first file in its series (anc58\_001\_01\_0001.dat & anc58\_001\_02\_3023.dat).

### ANC59 Pointing Mode Table

File format:

Direct access, record size = 8 bytes (2x integer\*4)

```
rec 1 :          201, 47171 -----(record# for first and last data record #s)
recs 2-200:      199x(time, record#) -----(199 time indexes into data)
recs 201-47171: (time, pointing mode)?
```

where the pointing mode is:

- 0 -- No pointing
- 1 -- Reference Track Pointing
- 2 -- Path Target Pointing
- 3 -- Scan (Ocean or ATW)

# Abbreviations & Acronyms

A2P	Algorithm-to-Product Conversion
ALT	Altimeter or Altimetry, also designation for the EOS-Altimeter spacecraft series
ANCxx	GLAS Ancillary Data Files
APID	GLAS Level-0 Data file
ATBD	Algorithm Theoretical Basis Document
ATM	Atmosphere
CCB	Change Control Board
ClearCase	GSAS version tracking software
CR	Change Request
DAAC	Distributed Active Archive Center
DEM	Digital Elevation Model
DFD	Data Flow Diagram
DLT	Digital Linear Tape
EDOS	EOS Data and Operations System
EDS	Expedited Data Set
ELEV	Elevation
EOC	EOS Operating Center
EOS	NASA Earth Observing System Mission Program
EOSDIS	Earth Observing System Data and Information System
GB	Gigabyte
GDS	GLAS Ground Data System
GLAS	Geoscience Laser Altimeter System instrument or investigation
GLAxx	GLAS Science Data Product Files
GLOP	GLAS Level-0 PGE (correctly called GLAS_L0proc)
TBD	to be determined, to be done, or to be developed



# Glossary

aggregate	A collection, assemblage, or grouping of distinct data parts together to make a whole. It is generally used to indicate the grouping of GLAS data items, arrays, elements, and EOS parameters into a data record. For example, the collection of Level 1B EOS Data Parameters gathered to form a one-second Level 1B data record. It could be used to represent groupings of various GLAS data entities such as data items aggregated as an array, data items and arrays aggregated into a GLAS Data Element, GLAS Data Elements aggregated as an EOS Data Parameter, or EOS Data Parameters aggregated into a Data Product record.
array	An ordered arrangement of homogenous data items that may either be synchronous or asynchronous. An array of data items usually implies the ability to access individual data items or members of the array by an index. An array of GLAS data items might represent the three coordinates of a georeference location, a collection of values at a rate, or a collection of values describing an altimeter waveform.
file	A collection of data stored as records and terminated by a physical or logical end-of-file (EOF) marker. The term usually applies to the collection within a storage device or storage media such as a disk file or a tape file.
header	A text and/or binary label or information record, record set, or block, prefacing a data record, record set, or a file. A header usually contains identifying or descriptive information, and may sometimes be embedded within a record rather than attached as a prefix.
item	Specifically, a data item. A discrete, non-decomposable unit of data, usually a single word or value in a data record, or a single value from a data array. The representation of a single GLAS data value within a data array or a GLAS Data Element.
label	The text and/or binary information records, record set, block, header, or headers prefacing a data file or linked to a data file sufficient to form a labeled data product. A label may consist of a single header as well as multiple headers and markers depending on the defining authority.
Level 0	The level designation applied to an EOS data product that consists of raw instrument data, recorded at the original resolution, in time order, with any duplicate or redundant data packets removed.
Level 1A	The level designation applied to an EOS data product that consists of reconstructed, unprocessed Level 0 instrument data, recorded at the full resolution with time referenced data records, in time order. The data are annotated with ancillary information including radiometric and geometric calibration coefficients, and georeferencing parameter data (i.e., ephemeris data). The included, computed coefficients and parameter data have not however been applied to correct the Level 0 instrument data contents.
Level 1B	The level designation applied to an EOS data product that consists of Level 1A data that have been radiometrically corrected, processed from raw data into sensor data units, and have been geolocated according to applied georeferencing data.

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Level 2	The level designation applied to an EOS data product that consists of derived geophysical data values, recorded at the same resolution, time order, and geo-reference location as the Level 1A or Level 1B data.
Level 3	The level designation applied to an EOS data product that consists of geophysical data values derived from Level 1 or Level 2 data, recorded at a temporally or spatially resampled resolution.
Level 4	The level designation applied to an EOS data product that consists of data from modeled output or resultant analysis of lower level data that are not directly derived by the GLAS instrument and supplemental sensors.
metadata	The textual information supplied as supplemental, descriptive information to a data product. It may consist of fixed or variable length records of ASCII data describing files, records, parameters, elements, items, formats, etc., that may serve as catalog, data base, keyword/value, header, or label data. This data may be parsable and searchable by some tool or utility program.
orbit revolution	The passage of time and spacecraft travel signifying a complete journey around a celestial or terrestrial body. For GLAS and the EOS ICESat spacecraft each orbit revolution count starts at the time when the spacecraft is on the equator traveling toward the North Pole, continues through the equator crossing as the spacecraft ground track moves toward the South Pole, and terminates when the spacecraft has reached the equator moving northward from the South Polar region.
parameter	Specifically, an EOS Data Parameter. This is a defining, controlling, or constraining data unit associated with a EOS science community approved algorithm. It is identified by an EOS Parameter Number and Parameter Name. An EOS Data Parameter within the GLAS Data Product is composed of one or more GLAS Data Elements.
pass	A sub-segment of an orbit, it may consist of the ascending or descending portion of an orbit (e.g., a descending pass would consist of the ground track segment beginning with the northernmost point of travel through the following southernmost point of travel), or the segment above or below the equator (e.g., either the northern or southern hemisphere portion of the ground track on any orbit).
product	Specifically, the Data Product or the EOS Data Product. This is implicitly the labeled data product or the data product as produced by software on the DAAC or SCF. A GLAS data product refers to the data file or record collection either prefaced with a product label or standard formatted data label or linked to a product label or standard formatted data label file. Loosely used, it may indicate the entire set of product files contained in a data repository.
record	A specific organization or aggregate of data items. It represents the collection of EOS Data Parameters within a given time interval, such as a one-second data record. It is the first level decomposition of a product file.
Standard Data Product	Specifically, a GLAS Standard Data Product. It represents an EOS ICESat/ GLAS Data Product produced on the DAAC or on the SCF. It is routinely produced and is intended to be archived in the EOSDIS data repository for EOS user community-wide access and retrieval.
variable	Usually a reference in a computer program to a storage location.

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